

Radiotherapy-Induced Vitiligo in a Patient with Carcinoma Buccal Mucosa: A Case Report

SUNIL CHOUDHARY

ABSTRACT

Vitiligo significantly affects self-esteem and deteriorates the quality of life of affected persons. Radiotherapy has several early and late effects but it is not known to induce vitiligo. This is a case report of a patient suffering from carcinoma buccal mucosa that had developed vitiligo in the radiotherapy portal. To the best of my knowledge this is a one of the first case reports of its kind as this patient had no history of vitiligo but developed it soon after radiotherapy.

Since radiotherapy is an essential component of cancer management, the radiation oncologist must be aware of this toxicity of radiotherapy. Choosing the high energy of photon beam may reduce the risk of such toxicities.

Keywords: Head and neck cancer, Hypopigmentation, Toxicity

CASE REPORT

A 45-year-old patient presented with an ulcer over the cheek on the left side for one month duration. He gave a history of chewing tobacco for over 20 years. He did not have any history of vitiligo or any other chronic skin disorder. He was investigated and diagnosed as squamous cell carcinoma of buccal mucosa stage T2N0M0. He was treated with external beam radiotherapy on Telecobalt Unit to a dose of 70Gy/35 fractions over 7 weeks to the face and draining lymph nodes. He had developed grade 3 mucositis and grade 2 skin reaction (according to the common toxicity criteria) in the radiotherapy portal at the time of completion.

On his first follow-up after 1 month it was found that the skin in the radiotherapy portal was glowing and was very smooth. He had the same sort of skin changes until after 5 months of completion of radiotherapy we found that there was depigmented macular area which strictly matched the radiotherapy treated area [Table/Fig-1]. On general examination it was discovered that he had depigmented macular areas involving the web of his fingers in the hands and feet.

He was referred to a dermatologist where he was diagnosed as suffering from vitiligo. Treatment for the same was initiated.



[Table/Fig-1]: Image of the patient with vitiligo in the radiotherapy field

DISCUSSION

Patients with vitiligo have characteristic circumscribed depigmentation of the skin and hair with loss of melanocytes [1]. The exact cause of the disease is not known. Several theories concerning the cause of the disease have been advocated but the most likely cause seems to be an autoimmune phenomenon associated with underlying genetic predisposition. Depigmentation may be the source of severe psychological distress and significantly impairs quality of life [2].

Kobner phenomenon resulting in vitiligo as a result of exposure of radiation to the skin was reported by Levine et al., wherein two patients of breast cancer who had developed vitiligo in the skin exposed to radiation beam [3]. A Munshi et al., had reported a case of lady who was already having vitiligo in her lips and hands [4]. She was treated with radiotherapy to her chest wall and draining lymph nodes after she had undergone modified radical mastectomy for breast cancer. After six months of radiotherapy she developed vitiligo in the area which matched with her radiotherapy fields.

A similar case was reported by R Wintzen et al., where a middle aged lady with evidence of vitiligo confined to lips and hands had developed depigmentation in the radiation portal area after a couple of months of completion of radiotherapy [5].

Pajonk F et al., had reported about a patient who was treated with radiotherapy for Hodgkin's disease [6]. He had a 25 year history of vitiligo. He developed vitiligo in the treated area about 40 months of completion of radiotherapy.

The above mentioned case reports [3-6] had patients with pre-existing vitiligo. Patients with prior history of vitiligo have increased risk of developing depigmentation in the radiotherapy portal area. This is probably due to increased radiosensitivity of melanocytes in this disorder. The early cell death of melanocytes in vitiligo is because of their increased sensitivity to the oxidative stress caused by radiotherapy [4-5].

In the present case, the patient did not have any previous history of vitiligo and that the depigmented macules appeared not only at the site of radiotherapy portal but also involved the other usual sites of vitiligo. It took about 5 months for the depigmented macules to appear after radiotherapy. There have been only two case reports prior to this wherein a patient of carcinoma nasopharynx with no history of vitiligo had developed vitiligo after radiotherapy [7] and another case wherein a patient of malignant melanoma with no history of vitiligo had developed vitiligo after radiotherapy [8].

The mechanisms that cause damage to melanocytes leading to their disappearance in the affected skin are still debatable and speculative. There are several pathophysiologic theories; the most prominent are autoimmune, neurohumoral and autocytoxic. It is presumed that the damage to the melanocytes is multifactorial. The recent view is that vitiligo represents a group of heterogeneous pathophysiologic disorders with a similar phenotype. The convergence theory states that stress, accumulation of toxic compounds, infection, autoimmunity, mutations, altered cellular environment, and impaired melanocytes migration can all contribute to pathogenesis [9].

The exact pathogenesis of development of disseminated depigmentation is not known. A "two-hit" hypothesis has been suggested. Radiotherapy causes increased oxidative stress which in turn triggers the process of haptination. This results in formation of neoantigens which are highly immunogenic. This leads to systemic autoimmune response to melanocytes resulting in sites of depigmentation distant to the irradiation field [10].

CONCLUSION

This clinical scenario alludes that radiotherapy can trigger vitiligo in patients who have no previous history of vitiligo. It is a unique case as the vitiligo developed in the patient with no history of the same and secondly the vitiligo that matched the radiotherapy portal appeared simultaneously with the areas of the body. Since the incidence is so rare it would be very difficult to predict which patient has the risk of developing vitiligo. However, the risk of vitiligo can be minimized by use of megavoltage photon beam which has a skin sparing property.

CONSENT STATEMENT

"Written informed consent was obtained from the patient for publication of this case report and the accompanying images. A copy of the written consent is available for review by the Editor of this journal."

ACKNOWLEDGEMENTS

We gratefully acknowledge the patient and his family for their cooperation.

REFERENCES

- [1] Njoo MD, Westerhof W. Vitiligo. Pathogenesis and treatment. *Am J Clin Dermatology*. 2001;2:167-81.
- [2] Prasad D, Dogra S, Kanwar JA. Quality of life in patients with vitiligo. *Health and Quality of Life Outcomes*. 2003;1:58-60.
- [3] Levine EL, Ribeiro GG. Vitiligo and radiotherapy: The Koebner phenomenon in patients with vitiligo undergoing radiotherapy for carcinoma of the breast. *Clin Oncol (R Coll Radiol)*. 1994;6:133-34.
- [4] Munshi A, Jain S, Budrukkar A, Jalali R, Sarin R. Radiotherapy-induced depigmented in a patient with breast cancer. *Indian J Cancer*. 2007;44:157-58.
- [5] Weitzner R, Pfeffer R, Mandal M. Benign lesions in cancer patients: Vitiligo after radiotherapy for breast cancer in a woman with depigmented disorder. *J Clin Oncol*. 2005;23:644.
- [6] Pajonk F, Weissenberger C, Witucki G, Henke M. Vitiligo at the sites of irradiation in a patient with Hodgkin's disease. *Strahlenther Onkol*. 2002;178:159-62.
- [7] Polat M, Yalcin B, Alli N. Vitiligo at the site of radiotherapy for nasopharyngeal carcinoma. *Am J Clin Dermatology*. 2007;8:247-49.
- [8] Pavithran K, Pande SB, Dinesh M. Report of a Case of Radiation-Induced New-Onset Vitiligo with collective review of cases in the Literature of Radiation-Related Vitiligo. *Case Reports in Medicine*. 2013;2013:345473.
- [9] Le Poole IC, Das PK, van den Wijngaard RM, Bos JD, Westerhof W. Review of the etiopathomechanism of vitiligo: a convergence theory. *Exp Dermatol*. 1993;2:145-53.
- [10] Daneshpazhooh M, Shokoohi A, Raafat J. The course of melanoma-associated vitiligo: Report of a case. *Melanoma Res*. 2006;16:371-73.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Radiotherapy and Radiation Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sunil Choudhary,
Assistant Professor Department of Radiotherapy & Radiation Medicine, Institute of Medical Sciences,
Banaras Hindu University, Varanasi-221005, India.
E-mail: drsunil104@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jun 02, 2015**
Date of Peer Review: **Jun 25, 2015**
Date of Acceptance: **Jul 02, 2015**
Date of Publishing: **Aug 01, 2015**