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Vitiligo Onset in Older Age Post Folfox Chemotherapy in a Colon Carcinoma Patient: Case Report

Ummu Aiman[1], Densy Violina Harnanti[1], Efenina Ginting[2], Febelia Devina Setyadarma[3], Aulia Aiman[4]

[1]School of Medicine, Universitas Hang Tuah Surabaya, Indonesia
[1]Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[2]Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[3]Faculty of Medicine, Universitas Katolik Widya Mandala Surabaya, Indonesia
[4]Faculty of Medicine, Universitas Udayana, Indonesia

Corresponding Author: Ummu Aiman

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ABSTRACT

Vitiligo is a pigmentation disorder characterized by the progressive loss of melanocytes, leading to distinct depigmented macules. Vitiligo with onset at an older age is relatively rare, especially when it appears after chemotherapy. We report a case of generalized vitiligo in a 74-year-old female patient with a history of colon carcinoma who received a Folfox chemotherapy regimen (5-fluorouracil, leucovorin, oxaliplatin). Depigmented lesions commenced following the third treatment round and progressively enlarged. The diagnosis was established based on characteristic clinical features without additional examinations due to limited facilities. The patient was treated with 5% liquor carbonis detergens (LCD) combined with topical corticosteroids, showing a good initial clinical response. This case report highlights the potential association between FOLFOX chemotherapy and the development of late-onset vitiligo, as well as the importance of clinical diagnosis in daily practice.

Keywords: *vitiligo, chemotherapy, folfox, colon carcinoma*

INTRODUCTION

Vitiligo is a chronic depigmentary disorder characterized by the appearance of milky-white macules or patches resulting from damage to melanocytes. (1,2).

The prevalence of vitiligo is estimated to be approximately 0.5–2% (4). Vitiligo is common in the general population and typically appears during childhood or young adulthood (5). The epidemiology of vitiligo in the elderly is infrequently documented and inadequately characterized, frequently presenting diagnostic challenges (5).

Numerous factors contribute to the pathogenesis of vitiligo, including genetic predispositions, autoimmune mechanisms, oxidative stress, compromised melanocyte adhesion, neurohumoral influences, autocytotoxicity, vitamin D deficiency, hyperhomocysteinemia, and environmental factors (3) Recent data indicate a correlation between vitiligo and cancer therapies, particularly those that alter immune system function (11,12). However, vitiligo arising after conventional cytotoxic chemotherapy such as Folfox (5-fluorouracil, leucovorin,

oxaliplatin) remains rarely reported. This case report aims to describe a case of late-onset vitiligo that developed after Folfox chemotherapy in a patient with colon carcinoma.

CASE REPORT

A 74-year-old female patient presented to the outpatient clinic with complaints of white patches on her upper right arm, which subsequently disseminated to her chest, neck, and shoulders. The initial lesions appeared approximately six months prior to the visit, coinciding with the completion of the patient's third cycle of chemotherapy. Since their onset, the lesions have progressively enlarged, and many depigmented macules have coalesced.

The patient has a history of colon cancer and underwent surgical intervention followed by six cycles of Folfox chemotherapy (5-fluorouracil, leucovorin, and oxaliplatin). There is no familial history of analogous issues. The patient did not experience pruritus, discomfort, or any systemic manifestations linked to the cutaneous lesions.

On dermatological examination of the anterior and lateral neck region, bilateral supraclavicular region, anterior thoracic region (upper chest to the intermammary area), superior dorsal region (upper back to the interscapular area), the bilateral brachial region (upper arm to the distal forearm), and the dorsal hand region, multiple depigmented macules of varying sizes ranging from 0.5 cm to over 5 cm. The lesions exhibited round, oval, or irregular shapes, characterized by well-defined borders, a milky white color, a smooth, non-scaly surface, and a lack of elevation. Certain lesions merge to create larger patches. No scales, crusts, erosions, ulcers, lichenification, atrophy, or inflammatory symptoms are present in the depigmented regions. Supporting examinations, like Wood's lamp or histopathology, were not performed due to facility limitations at the time.

Dermatological Findings: Multiple depigmented macules are observed on the anterior and lateral neck, bilateral supraclavicular regions, anterior thoracic region (upper chest to the intermammary area), superior dorsal region (upper back to the interscapular area), bilateral upper arm region (upper arm to the distal forearm), and dorsal hand region. These macules vary in size from 0.5 cm to over 5 cm and exhibit shapes ranging from round and oval to irregular and geographic, characterized by well-defined borders, a milky white color, a smooth, non-scaly surface, and no visible elevation. Certain lesions merge to create larger patches. No scaling, crusting, erosion, lichenification, atrophy, or inflammatory symptoms are noted in the depigmented regions. Considering the medical history and clinical findings, the patient was diagnosed with vitiligo, likely associated with chemotherapy.

The patient received treatment with 5% liquor carbonis detergens (LCD) combined with a topical corticosteroid, applied twice daily. During the initial assessment, no adverse effects were noted.

DISCUSSION

Vitiligo generally manifests between the ages of 20 and 40; therefore, onset in older age, as in this case, is an uncommon finding (5,6). The prevalence of late-onset vitiligo varies by region, from Iran to Southeast Asia, ranging from 6.5% to 14.7%. The average age of onset was found to range from the mid- to late 50s across all studies, with little regional variation, with the average age of onset ranging from 52.5 to 59.4 ± 7.4 years. The gender distribution was nearly equal, with most studies reporting a nearly balanced gender ratio (13).

Some literature suggests that late-onset vitiligo is often associated with specific triggering factors, including medications and systemic diseases (13,14).

FOLFOX chemotherapy (5-fluorouracil, leucovorin, oxaliplatin) is the standard regimen for colorectal carcinoma and acts through a cytotoxic mechanism against rapidly proliferating cells (15). Although not classified as immunotherapy, chemotherapy can induce immunological changes and oxidative stress that may lead to melanocyte destruction. This mechanism is suspected to play a role in the development of vitiligo in this patient. The components of FOLFOX specifically 5-FU and oxaliplatin can elevate intracellular ROS levels (16). Elevated levels of reactive oxygen species (ROS) induce oxidative stress, which disrupts redox homeostasis (17)(18). Excessive ROS production causes an imbalance in the antioxidant system of melanocytes, leading to cellular damage. High ROS concentrations are implicated in the destruction of melanocytes in various

ways, including structural and functional impairment of DNA, lipids, proteins, and metabolites (17)(18). The accumulation of oxidative stress from ROS disrupts macromolecules in epidermal melanocytes, thereby impairing melanocyte function. ROS plays a role in melanocyte destruction through various mechanisms, including DNA damage, lipid peroxidation, mitochondrial dysfunction, and stress on the endoplasmic reticulum. Melanocyte DNA undergoes damage due to chronic oxidative stress stimuli, leading to cellular senescence, where cells irreversibly cease to proliferate (17). Mitochondria are a major source of ROS, yet oxidative stress can damage mitochondria, and mitochondrial dysfunction affects the survival of melanocytes (17)(18).

Oxaliplatin induces the formation of intra- and interstrand DNA crosslinks, forms DNA-protein adducts, and triggers the formation of reactive oxygen species (ROS) and toxic oxygen metabolites, which exert cytotoxic effects through the induction of DNA damage and apoptosis (19).

The cytotoxic nature of oxaliplatin is thought to stem from mitochondrial ROS (mtROS). Oxaliplatin penetrates the mitochondrial membrane and increases the production of mitochondrial ROS (mtROS). Oxaliplatin also increases ROS through mitochondrial dysfunction in both normal cells and colorectal cancer cells, where Bcl-2-BAX-mediated apoptosis renders oxaliplatin cytotoxic (20). Oxaliplatin increases oxidative stress in the Nrf2 signaling pathway in colorectal cancer cells by inhibiting the Nrf2 signaling pathway, thereby making colorectal cancer cells more sensitive to oxaliplatin (21). Nrf2 functions in regulating cellular redox homeostasis, and several studies indicate that the Nrf2 pathway plays a crucial role in protecting melanocytes from oxidative stress. Reduced Nrf2-ARE activity leads to decreased antioxidant enzyme activity and increased oxidative stress, making melanocytes more vulnerable to oxidative stress (18). 5-FU (five-fluorouracil) is cytotoxic to colorectal cancer cells through the incorporation of fluoronucleotides into RNA and DNA strands and through the inhibition of the enzyme thymidylate synthase. 5-FU can increase ROS through mechanisms involving damage to mitochondrial DNA and stress on the endoplasmic reticulum (20).

The diagnosis of vitiligo in this case was established clinically based on the appearance of sharply demarcated depigmented macules with a characteristic milky white color, without the presence of fine scales (7).

Differential diagnoses in this case include post-inflammatory hypopigmentation (PIH), pityriasis alba, and idiopathic guttate hypomelanosis (IGH).

Post-inflammatory hypopigmentation (PIH) generally appears after a process of skin inflammation and is characterized by partial hypopigmentation with a history of previous inflammatory lesions, which was not found in this patient, as there was no history of dermatitis, erythema, trauma, or residual signs of inflammation in the depigmented area. Furthermore, PIH tends to show spontaneous repigmentation and does not progress to widespread homogeneous depigmentation as seen in vitiligo (8).

Pityriasis alba is more common in children and young adults, presenting as mild hypopigmented lesions with poorly defined borders and often accompanied by fine scales; this condition is also self-limiting, making it inconsistent with the clinical presentation of an elderly patient with well-defined, milky-white macules lacking scales (9).

Idiopathic guttate hypomelanosis (IGH) is generally found in the elderly as multiple small macules measuring a few millimeters in sun-exposed areas and rarely coalesce into large patches; the size of the lesions in this case, which reached >5 cm, as well as the pattern of progressive coalescence, do not align with the characteristics of IGH (10).

However, the widespread distribution of lesions, their progressive nature, and the

clinical characteristics support a diagnosis of vitiligo.

A limitation of this case report is the absence of supportive tests such as Wood's light examination or histopathological examination. Nevertheless, in daily clinical practice, a diagnosis of vitiligo can often be established based on characteristic clinical features, particularly in facilities with limited resources.

Vitiligo therapy aims to inhibit progression and stimulate repigmentation (2). The combination of topical corticosteroids and 5% LCD is still widely used, particularly in elderly patients, considering its safety profile and ease of use (2).

CONCLUSION

Late-onset vitiligo emerging after FOLFOX chemotherapy is a rarely reported condition. This case highlights the potential association between chemotherapy and the development of vitiligo through immunological mechanisms and oxidative stress. Careful clinical diagnosis remains crucial, particularly in settings with limited diagnostic resources. This case report is expected to contribute to the understanding of the spectrum of post-chemotherapy skin manifestations.

Declaration by Authors

Consent of patient: Patient consent has been obtained for the publication of this case report while maintaining the patient's anonymity.

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REFERENCES

1. Albelowi LM, Alhazmi RM, Ibrahim S. The Pathogenesis and Management of Vitiligo. Cureus. 2024;16(12): e75859. Published 2024 Dec 17. doi:10.7759/cureus.75859
2. AL-smadi K, Imran M, Leite-Silva VR, Mohammed Y. Vitiligo: A Review of Aetiology, Pathogenesis, Treatment, and Psychosocial Impact. Cosmetics. 2023; 10(3):84. https://doi.org/10.3390/cosmetics10030084
3. Yonathan, Erico. (2023). Vitiligo: Update of Pathogenesis and Treatment. Journal of Medicine and Health. 5. 95-109. 10.28932/jmh. v5i1.3954.
4. Bergqvist, C., & Ezzedine, K. (2020). Vitiligo: a review. Dermatology, 236(6), 571-592.
5. Kong, Y. L., Ching, V. H. L., Chuah, S. Y., & Thng, T. G. (2017). Retrospective study on the characteristics and treatment of late-onset vitiligo. Indian Journal of Dermatology, Venereology and Leprology, 83, 625.
6. Lazzeri, L., Colucci, R., Cammi, A., Dragoni, F., & Moretti, S. (2016). Adult-onset vitiligo: multivariate analysis suggests the need for a thyroid screening. BioMed Research International, 2016(1), 8065765.
7. Gran, F., Emmerich, K., Mohme, S., Goebeler, M., & Gesierich, A. (2020). Vitiligo-like lesions developing upon immune checkpoint inhibition in advanced melanoma. European Journal of Dermatology, 30(1), 72-73.
8. Vachiramon, V., Thadanipon, K. (2011) Postinflammatory hypopigmentation, *Clinical and Experimental Dermatology*, Volume 36, Issue 7, 708–714, https://doi.org/10.1111/j.1365-2230.2011.04088.x
9. Alikhan, A., Felsten, L. M., Daly, M., & Petronic-Rosic, V. (2022). Common hypopigmentation disorders: Clinical approach and management. Journal of Clinical Medicine, 11(9), 2503. https://doi.org/10.3390/jcm11092503
10. Rodrigues, M., Ezzedine, K., Hamzavi, I., Pandya, A. G., & Harris, J. E. (2021). Idiopathic guttate hypomelanosis: Clinical features and management update. Dermatology Practical & Conceptual, 11(4), e2021105. https://doi.org/10.5826/dpc.1104a105
11. Lo J, Hanania HL, Keiser MF, Patel AB. Immune checkpoint inhibitor-induced vitiligo in cancer patients: characterization and management. Arch Dermatol Res. 2023 Aug;315(6):1697-1703. doi: 10.1007/s00403-023-02577-7. Epub 2023 Feb 21. PMID: 36809408.
12. Yang, Ming-Han & Chang, Dwan-Ying. (2018). Vitiligo after immune checkpoint

inhibitor therapy in a woman with metastatic melanoma. Journal of Cancer Research and Practice. 5. 10.1016/j.jcrpr.2018.07.002.
13. Hasan, Z., & Pathania, Y.S. (2024). Late-Onset Vitiligo: Epidemiology, Clinical Characteristics, and Management Strategies. Journal of Cosmetic Dermatology, 24.
14. Shen N, Fang Q, Wu Y, Lan L, Ma F. Drug-induced vitiligo: a real-world pharmacovigilance analysis of the FAERS database. PLoS One. 2025;20(9):e0332079. Published 2025 Sep 8. doi: 10.1371/journal.pone.0332079
15. Mauri G, Gori V, Bonazzina E, et al. Oxaliplatin retreatment in metastatic colorectal cancer: Systematic review and future research opportunities. Cancer Treat Rev. 2020; 91:102112. doi: 10.1016/j.ctrv.2020.102112
16. Afzal S, Astrup S. Oxidative damage to guanine nucleosides following combination chemotherapy with 5-fluorouracil and oxaliplatin. Cancer Chemother Pharmacol. 2012;301–7.
17. Chen J, Li C. Mechanisms of melanocyte death in vitiligo. Med Res Rev. 2021;(October 2020):1138–66.
18. Xuan Y, Yang Y, Xiang L, Zhang C. Review Article The Role of Oxidative Stress in the Pathogenesis of Vitiligo: A Culprit for Melanocyte Death. Oxid Med Cell Longev. 2022;2022.
19. Santoro V, Jia R, Thompson H, Nijhuis A, Jeffery R, Kiakos K, et al. Role of Reactive Oxygen Species in the Abrogation of Oxaliplatin Activity by Cetuximab in Colorectal Cancer. JNCI J Natl Cancer Inst. 2016; 108:1–11.
20. Lyons NJ, Giri R, Begun J, Clark D, Proud D, He Y, et al. Reactive Oxygen Species as Mediators of Disease Progression and Therapeutic Response in Colorectal Cancer. Antioxid Redox Signal. 2023; 39:186–205.
21. Liu BEN, Wang HUI. Oxaliplatin induces ferroptosis and oxidative stress in HT29 colorectal cancer cells by inhibiting the Nrf2 signaling pathway. Exp Theuraphetic Med. 2021;

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