Oncolytic effect of SARS-CoV-2 in a patient with mycosis fungoides (MF): a case report

Laya Ohadi[1], Fatemeh Hosseinzadeh[1], Sahar Dadkhahfar[1], and Soheila Nasiri[2]

[1]Shahid Beheshti University of Medical Sciences
[2]Skin Research Center Shahid Beheshti University of Medical Sciences

January 13, 2022

Abstract

The most common variant of cutaneous T-cell lymphomas (CTCL) is mycosis fungoides (MF).The spontaneous regression (SR) of MF is rare. Here, we are reporting an interesting case of refractory MF after COVID-19. The SARS-CoV-2 could be an essential component in the improvement of clinical features related to MF.

Oncolytic effect of SARS-CoV-2 in a patient with mycosis fungoides (MF): a case report

Laya Ohadi[1] MD, Fatemeh Hosseinzadeh[2] MD, Sahar Dadkhahfar*[2]MD Soheila Nasiri*[2] MD

*Correspondence: Sahar.dadkhahfar@gmail.com Nasiri_s@hotmail.com[2]Skin Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran Full list of author information is available at the end of the article

Introduction

Cutaneous T-cell lymphomas (CTCL) that are characterized by accumulation of malignant T lymphocytes in the skin, are rare types of non-Hodgkin lymphoma (1, 2).The most common variant is mycosis fungoides (MF) with characteristic patches, plaques, and tumors arising in the skin and an indolent behavior(2-4). Patients with MF often experience a chronic course of disease, with waxing and waning skin lesions(4). The spontaneous regression (SR) although rare, may occur; however, the factors that predict SR have not been identified yet(5).

Previously, complete remission (CR) of cutaneous T-cell lymphoma was reported in an HIV-infected patient associated with a falling CD4 count(6).

Since the beginning of the COVID-19 pandemic studies have shown a clear decrease in peripheral lymphocytes and natural killer (NK) cells in COVID-19 patients(7). In fact, the lympho-depletion induced by severe acute respiratory syndrome coronavirus 2 (Sars-Cov-2) has a crucial diagnostic role and represents a valid prognostic tool(8). Here we report an interesting case of refractory MF after COVID-19.

Case Presentation

In August 2020, a 64-years-old male presented with severe symptoms such as dry cough and dyspnea related to COVID-19 infection, confirmed by both chest tomography (CT) scan and oropharyngeal swab polymerase chain reaction (PCR). He was treated in outpatient setting by receiving supportive medications and maintaining home quarantine. No other specific drugs were administered.

His past medical history was positive for MF, diabetes, hyperlipidemia and ischemic heart disease. His drug history was Metformin 1000 milligrams (mg) three times a day, Rosuvastatin 10 mg daily, Aspirin 80 mg

daily and Nitroglycerin 2.6 mg daily. Lab test was only significant for a mild lymphopenia.

The patient had been diagnosed with early patch MF after a five-month history of pruritus and erythematous patches scattered over trunk and upper and lower extremities, back in November 2018. His condition was confirmed by skin biopsy and immuno-histochemical studies.

The patient showed partial remission with several courses of ultraviolet B (UVB) (79 sessions between December 2018 and May 2020).

Three weeks after improvement of COVID-19, our patient experienced complete remission of all of MF related lesions. For six months, he was symptom free but after six months, some of his lesions recurred but with lesser severity and limited distribution on back.

Discussion

The surprising clinical improvement of our case may suggest an antineoplastic role for SARS-CoV-2 infection, as if the virus had acted as an oncolytic agent. This case experienced the remission of his condition 21 days after complete clearance of COVID-19 infection confirmed by negative oropharyngeal swab PCR; however, recurrence of itching and skin patches was noticed after few months.

Several studies have illustrated an oncolytic role for a variety of viruses. The antitumor immunomodulatory actions triggering lympho-depletion are well established. In fact, oncolytic viruses are engineered to express some cytokines, including tumor necrosis factor alpha (TNF-a) and interleukin-2 (IL-2) to deplete T cells, as a part of adoptive therapy(9, 10).

Furthermore, oncolytic viruses can exert antitumor activity that cause lymphocytic cells reduction identical to high dose chemotherapy(11). The underlying mechanism for improvement of MF after COVID-19 maybe related to the large amount of pro-inflammatory cytokines, such as interleukin 6 (IL-6), TNF-a, IL-2 release during COVID-19 infection that attract T and NK cells to the neoplastic T-cells(11, 12).

On the other hand, the SARS-CoV-2 could be a probable pivotal element in the apparent improvement of clinical features related to MF similar to human immunodeficiency virus (HIV)(6, 12). Furthermore, in a previous report an HIV seropositive patient developed MF that was surprisingly improved after development of apparent HIV disease(6).

Conclusion

This case report supports the antineoplastic effect of SARS-CoV-2 which has been previously suggested in a case of African 20-years-old male with a temporary remission of refractory NK/T-cell lymphomas after COVID-19 infection but relapse after recovery from SARS-CoV-2(12). The underlying mechanism of T cell depletion or oncolytic effects of COVID-19 in not known and further studies are needed to elucidate this possible role.

Abbreviations

CTCL: Cutaneous T-Cell Lymphomas; MF: Mycosis Fungoides; CR: Complete Remission; NK: Natural Killer; CT: Computer Tomography; UVB: Ultraviolet B; TNF-a: Tumor Necrosis Factor Alpha; IL-2: Interleukin-2; IL-6: Interleukin-6; HIV: Human Immunodeficiency Virus; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; PCR: Polymerase Chain Reaction.

Acknowledgements

We would like to thank Dr. Kevin Pehr, associate professor dermatology in McGill university for his help reviewing the writing.

Authors' contributions

LO wrote the manuscript. SD and SN wrote and corrected the manuscript for its scientific basis. FH collected the data for the study. SD revised the manuscript for grammar and syntax mistakes. All authors

read and approved the final manuscript.

Funding

No additional funding for the execution of the present study was received.

Availability of data and materials

The data and materials used in the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Our case report obtained ethics approval from institutional committee board and the patient gave their informed consent to participate.

Consent for publication

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

Competing interests

The authors declare that they have no competing or conflict of interests.

Author details

1 Shahid Beheshti University of Medical Sciences, Tehran, Iran. 2 Skin Research Center, Shahid Beheshti Universiry of Medical Sciences, Tehran, Iran.

Refrences

1. Kashani-Sabet M, McMillan A, Zackheim HS. A modified staging classification for cutaneous T-cell lymphoma. Journal of the American Academy of Dermatology. 2001;45(5):700-6.

2. Willemze R, Jaffe ES, Burg G, Cerroni L, Berti E, Swerdlow SH, et al. WHO-EORTC classification for cutaneous lymphomas. Blood. 2005;105(10):3768-85.

3. Wood DE. National Comprehensive Cancer Network (NCCN) clinical practice guidelines for lung cancer screening. Thoracic surgery clinics. 2015;25(2):185-97.

4. Prince HM, Duvic M, Martin A, Sterry W, Assaf C, Straus DJ. Incidence of spontaneous remission in patients with CD25-positive mycosis fungoides/Sezary syndrome receiving placebo. Journal of the American Academy of Dermatology. 2012;67(5):867-75.

5. Talpur R, Bassett R, Duvic M. Prevalence and treatment of Staphylococcus aureus colonization in patients with mycosis fungoides and Sézary syndrome. British Journal of Dermatology. 2008;159(1):105-12.

6. Sorrells T, Pratt L, Newton J, Graham S, Ryan M. Spontaneous regression of granulomatous mycosis fungoides in an HIV positive patient. Journal of the American Academy of Dermatology. 1997;37(5):876-80.

7. Pasin F, Mascalchi Calveri M, Calabrese A, Pizzarelli G, Bongiovanni I, Andreoli M, et al. Oncolytic effect of SARS-CoV2 in a patient with NK lymphoma. Acta Biomed. 2020;91(3):ahead of print.

8. Wang F, Nie J, Wang H, Zhao Q, Xiong Y, Deng L, et al. Characteristics of peripheral lymphocyte subset alteration in COVID-19 pneumonia. The Journal of infectious diseases. 2020;221(11):1762-9.

9. Snijder J, Mihyawi N, Frolov A, Ewton A, Rivero G. Spontaneous remission in diffuse large cell lymphoma: a case report. Journal of medical case reports. 2019;13(1):1-7.

10. Musto P, D'Arena G, Meillo L, Cascavilla N, Ladogana S, Carotenuto M. SPONTANEOUS REMISSION IN ACUTE MYELOID LEUKAEMIA: A ROLE FOR ENDOGENOUS PRODUCTIONOF TUMOUR NECROSIS FACTOR AND INTERLEUKIN-2? British journal of haematology. 1994;87(4):879-80.

11. Santos JM, Cervera-Carrascon V, Havunen R, Zafar S, Siurala M, Sorsa S, et al. Adenovirus coding for interleukin-2 and tumor necrosis factor alpha replaces lymphodepleting chemotherapy in adoptive T cell therapy. Molecular therapy. 2018;26(9):2243-54.

12. Pasin F, Calveri MM, Pizzarelli G, Calabrese A, Andreoli M, Bongiovanni I, et al. Oncolytic effect of SARS-CoV2 in a patient with NK lymphoma. Acta Bio Medica: Atenei Parmensis. 2020;91(3):e2020047.