



Case Report

Pancytopenia in COVID 19 patient - A rare case reported in Hypoxic ward of tertiary care centre.

***Dr.Sunderesh kamal Chander¹,Dr.Preethy.R²,Dr.Muthuvel³,
Dr.Yogalakshmi.E⁴***

¹ Postgraduate, ² Postgraduate, ³ Professor, ⁴ Tutor,
1234, Department of Pathology, Saveetha Medical College and Hospital, Saveeth Nagar,
Thandalam, Chennai 602105, Tamil Nadu, India.

***How to cite: Chandar S. K et al. Pancytopenia in COVID 19 patient - A rare case reported in Hypoxic ward of tertiary care centre. Int J Orofac.Biol.2022; 6(2):16-20
DOI: <https://doi.org/10.56501/intjorofacbiol.v6i2.730>***

Received :18/11/2022

Accepted:30/11/2022

Web Published: 18/12/2022

ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic is a serious public health concern worldwide. The virus mainly causes respiratory symptoms and other manifestation. Patients mainly an upper respiratory tract infection in over more than 90% cases more likely to have more severe condition and death, usually in older adults and people with certain pre-existing medical conditions. Assessments showed that COVID-19 can cause various alterations in the blood parameters. There are many common causes of pancytopenia, a new cause that has been documented in patient case studies in COVID-19. Clinical practitioners in all practice environments need to be able to identify pancytopenia and be aware of the associated complications and emergencies in order to provide appropriate intervention including a hematology consult. We report a case of 42 year old male with severe pancytopenia associated with COVID-19 infection (RT – PCR positive) that developed severe transient pancytopenia which improved with conservative management like oxygen saturation maintenance, steroids, antibiotics, vital signs monitoring and breathing exercises. Diagnosing pancytopenia in the setting of COVID-19 infection is challenging processes and requires ruling out all other etiopathological causes of pancytopenia. The present case report aims understand the relationship between COVID-19 disease and pancytopenia.

Keywords: COVID-19, Pancytopenia, Anemia, Leukocytopenia and Thrombocytopenia.

Address for Correspondence:

Name: Dr.U.Sunderesh Kamal Chander

Postgraduate, Department of Pathology, Saveetha Medical College and Hospital, Saveeth Nagar, Thandalam, Chennai 602105, Tamil Nadu, India.

Email: sundereshmbbs@gmail.com

Contact: +91-9176661300

Introduction

The corona virus disease 2019 is caused by the virus SARS-CoV-2 and is declared as a global pandemic by World Health Organization. It was first recognized in Wuhan, China, in December 2019. Genetic sequencing of the virus suggests that it is a beta coronavirus closely linked to the SARS virus.(1)The exact mode of transmission of the disease is not known, and while the current information is limited, it supports person-to-person transmission.(1,2) The most possible routes of transmission are thought to be droplet-based and contact-based . Patients mainly an upper respiratory tract infection in over more than 90% cases more likely to have more severe condition and death, usually in older adults and people with certain pre-existing medical conditions. Multianalytical study showed that COVID-19 can cause various alterations in the blood parameters. Pancytopenia is a common hematological condition often encountered in daily clinical practice. It is defined as hemoglobin of less than 10 g/dl, WBC less than 4000/mm, and platelets less than 100,000/mm [1]. Severe pancytopenia is defined as absolute neutrophil countless 500/cmm, platelet count less than 20,000/mm(3).

Case Report

A 42-year-old male came to the fever clinic with chief complaint of fever (102 °F), generalized body pain, sore throat, loss of smell, loss of taste and breathing difficulties. He had tachycardia but no organomegaly, lymphadenopathy or any other relevant examination findings made out. His Oxygen Saturation was 93%. On nasopharyngeal swabs was taken and RT – PCR test revealed COVID 19 positive. On Radiological examination CT scan showed multiple patches of peripheral ground glass opacities seen majorly in posterior base of bilateral lungs with few areas of consolidation in the background of interlobular septal thickening and CO-RADS 5 (Highly suspicious for COVID 19) (Fig 1). Patient was admitted in Hypoxic ward .On hematological investigations on revealed low hemoglobin (8.4 g/dL) anemia , decreased leukocyte count (2674 cells/mm³), thrombocytopenia (19,000 cells/mm³) and elevated D-dimer of 2.40 mcg/mL at the time of admission. On peripheral blood smear examination revealed pancytopenia (Fig 2). A patient was supported with 5 liters O₂, antibiotic therapy (T. Azithromycin and Inj. Remdesiver), steroid (methylprednisolone) and multivitamins with ferrous sulfate. Due to very low platelet count and risk of bleeding, we transfused three units of platelets.

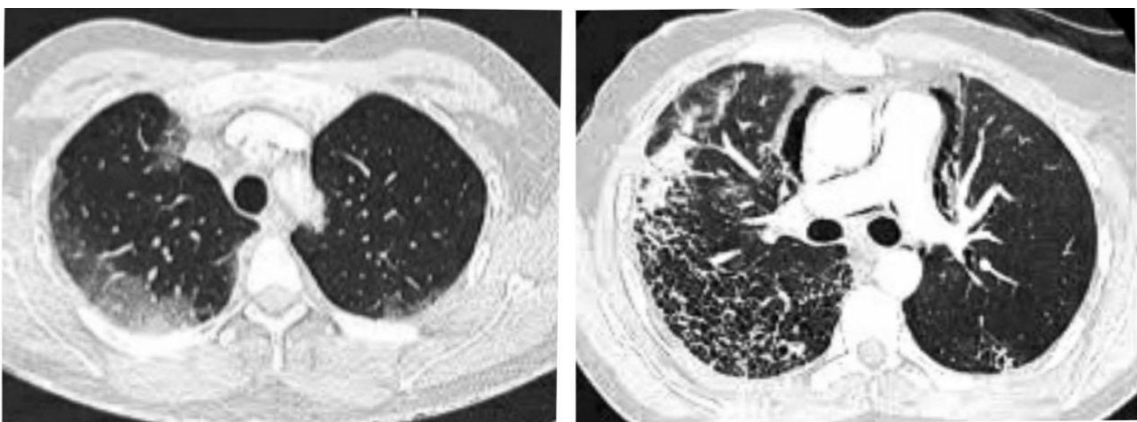


Figure 1: CT scan showing multiple patches of peripheral ground glass opacities seen majorly in posterior base of bilateral lungs with few areas of consolidation in the background of interlobular septal thickening.

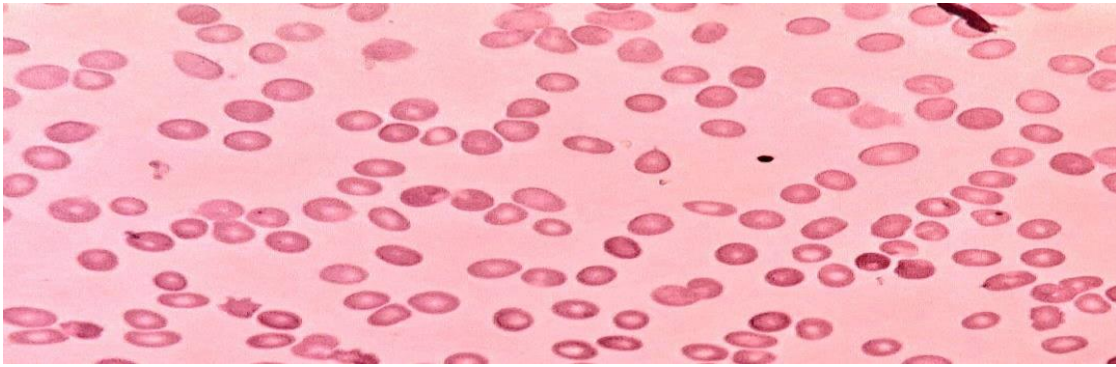


Figure 2: Peripheral blood smear examination demonstrating pancytopenia.

On day 4, hematological parameters revealed hemoglobin concentration (9.2 g/dL), decreased leukocyte count (2980 cells/mm³), thrombocytopenia (42,000 cells/mm³) and elevated D-dimer of 1.89 mcg/mL. Inj. Remdesivir and T. Azithromycin was stopped. On day 8, hematological parameters revealed hemoglobin concentration (9.6 g/dL), decreased leukocyte count (3608 cells/mm³), thrombocytopenia (76,000 cells/mm³) and elevated D-dimer of 1.74 mcg/mL. Oxygen saturation was 97% at room air, so intermittent oxygen support was given. On day 13, hematological parameters revealed hemoglobin concentration (10.1 g/dL), leukocyte count (4134 cells/mm³), platelet count (98,000 cells/mm³) and D-dimer of 0.96 mcg/mL (Table 1). With hematological parameters, clinical conditions and oxygen saturation improvement on consecutive days with repeat nasopharyngeal RT-PCR negative for COVID-19 patient was discharged and was asked to follow-up with pulmonology department.

Table: 1

Parameters	Day 1	Day 4	Day 8	Day 13
Hemoglobin (g/dL)	8.4	9.2	9.6	10.1
Total WBC count (cells/mm ³)	2674	2980	3608	4134
Platelet count (cells/mm ³)	19,000	42,000	76,000	98,000
D-dimer (mcg/mL)	2.40	1.89	1.74	0.96

Discussion

Bone marrow suppression can be seen in various viral infections. Because viral infection, an antigenic epitope to myelocytes could be exposed, leading to the production of autoantibody and the destruction of hematopoietic cells.

The angiotensin-converting enzyme 2 receptor, the target of the SARS-CoV-2, has been identified in bone marrow albeit at a low level (2,4). Therefore, it is possible that direct infection of myelocytes could lead to bone marrow

suppression. Based on a meta-analysis, anemia seems to be associated with an enhanced risk of severe COVID-19 infection(5,6). The possible pathophysiological link between anemia and severe COVID-19 may be multifactorial. In the circulation system, hemoglobin acts as a carrier for oxygen to target organs in the body. When the concentration of the Hb in the circulation is low, the transport of oxygen to several organs in the body will be disrupted, therefore causing hypoxia that will eventually result in multiple organ dysfunction, especially respiratory system dysfunction. SARS-CoV-2 can interact with hemoglobin on the erythrocyte through ACE2, CD147, and CD26 receptors. Both viral-hemoglobin interaction will cause the virus to attack the heme on the 1-beta chain of hemoglobin and causing hemolysis (5) .SARS-CoV directly infect primary T cells and induce massive apoptosis leads to decreased leukocytes, while the viral expansion in these cells is abortive(9). Coronavirus, also infects and destroys lymphocytes, which facilitate viral replication and persistence. Many previous studies, showed COVID-19 patients have been linked to the virus ability to infect T cells through the angiotensin-converting enzyme 2 receptors and cluster of differentiation CD147-spike proteins.

The final results were decreased levels of CD3+, CD4+, CD8+ T lymphocytes, and increased regulatory T cells. The elevation of pro-inflammatory cytokines with T

cell lymphopenia predisposes to cytokine storm, thus resulting in more lymphocytic apoptosis and multi-organ failure in COVID-19 patients(7). Recently pulmonary parenchyma has been identified as a site for platelet biogenesis and a reservoir for hematopoietic progenitors. With SARS-CoV-2 infection of the bone marrow and lung injury, it is possible that the destruction of lung hematopoietic progenitors could also contribute to pancytopenia(10,11).

Conclusion:

Our case report concludes, persistence of pancytopenia delays the recovery in COVID-19 patients. Hence, hematological parameter plays an important role in assessing the severity of critical COVID-19 cases. Due to proper monitoring of hematological value and vitals, our patient was able to be safely discharged home.

Conflict of Interest

There is no conflict of interest.

Financial support and sponsorship

Nil

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published.

References

- 1.World Health Organization: Coronavirus disease (COVID-2019) weekly epidemiological update. 2021. Available at:<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>. Accessed January 5, 2021.
- 2.Pascutti MF, Erkelens MN, Nolte MA. Impact of viral infections on haematopoiesis: From beneficial to detrimental effects on bone marrow output. *Front Immunol* 2016;7:364.

- 3.Varshney A, Barkoudah E. The simplest explanation: pancytopenia. Am J Med. 2018;131(9):1052–4.
- 4.Li MY, Li L, Zhang Y, Wang XS. Expression of the SARS-CoV-2 cell receptor gene ACE2 in a wide variety of human tissues. Infect Dis Poverty 2020;9:45.
- 5.Fan BE, Chong VCL, Chan SSW, et al. Hematologic parameters in patients with COVID-19 infection. Am J Hematol. 2020;95(6):E131-E153.
- 6.Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 2020; 395: 1054-62.
- 7.Liu J et al. (2020) Longitudinal characteristics of lymphocyte responses and cytokine profiles in the peripheral blood of SARS-CoV-2 infected patients. E Bio Medicine 55, 102763.
- 8.Zhao Y, He J, Wang J, Li WM, Xu M, Yu X, et al. Development of pancytopenia in a patient with COVID-19. J Med Virol 2021;93:1219-20.
- 9.Arentz M, Yim E, Klaff L, et al. Characteristics and Outcomes of 21 Critically Ill Patients With COVID-19 in Washington State. JAMA 2020;323:1612-14.
- 10.Bhatraju PK, Ghassemieh BJ, Nichols M, et al. Covid-19 in Critically Ill Patients in the Seattle Region - Case Series. N Engl J Med. 2020; 382:2012-22.
- 11.Hersby DS, Do TH, Gang AO, Nielsen TH. COVID-19-associated pancytopenia can be self-limiting and does not necessarily warrant bone marrow biopsy for the purposes of SARS-CoV-2 diagnostics. Ann Oncol 2021;32:121-3.



Published by MM Publishers

<https://www.mmpubl.com/ijofbio>

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 International License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc/4.0/> or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

Copyright©2022 Sunderesh kamal Chander, Preethy.R, Muthuvel, Yogalakshmi.E