Clinical Oncology: Case Reports

Case Report

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Use of COVID-19 Convalescent Plasma as Prophylaxis in a Patient with New Onset ALL

William R Hartman[1*], Aaron S Hess[2] and Joseph Connor[2]

Abstract

Patients with hematologic cancers are vulnerable to infection with Severe Acute Respiratory Disease-Coronavirus-2 (SARS-CoV-2), the virus responsible for COVID-19, given their immunodeficiency due to their pathology and their chemotherapy. We present a case report of a patient with severe immunodeficiency secondary to his newly diagnosed Acute Lymphoblastic Leukemia who incidentally was found to be infected with the novel coronavirus. In an attempt to avoid serious manifestations of COVID-19, this patient was prophylactically administered COVID-19 Convalescent Plasma, an emerging treatment for COVID-19 infection. This patient was asymptomatic from his COVID-19 infection but was a high risk of developing manifestations as he was requiring immediate and intense chemotherapy. Throughout his hospital course, including his several chemotherapy treatments, this patient remained infected with SARS-CoV-2, but did not develop disease.

Keywords

Covid-19; Infection; SARS; CoV-2; Chemotherapy

Intrduction

Coronavirus disease 2019 (COVID-19), the disease associated with SARS-CoV2 virus and responsible for a world-wide pandemic, disproportionally affects patients with co-morbid malignancies [1-4]. In fact, the mortality rate in cancer patients with COVID-19 is 28%, more than double that of age and sex-matched controls [5]. This high mortality rate may be the result of several possibilities including that many patients are immunocompromised due to their malignancy and/or their treatment for those cancers. Another factor is that cancer patients often must visit health care centers, many of which are caring for COVID-19 patients [6].

Patients with blood cancers, may be at even greater risk because of fluctuating myeloid and lymphoid cell numbers that render them susceptible to the cytokine storm associated with severe disease [5,7].

COVID-19 convalescent plasma is an emerging treatment for hospitalized patients afflicted with this virus. Convalescent Plasma confers passive immunity to an individual when a vaccine has not been developed. Specifically, antibody-rich plasma is extracted from individuals who have recovered from COVID-19 infection, checked for other viral pathogens, and then transfused into an individual who is currently sick with the infection with the desire to neutralize and clear the virus. Joyner et al, has reported in two different recent publications that the use of convalescent plasma is safe, though the effectiveness of convalescent plasma has yet to be determined.

Individuals stricken with hematologic malignancies are at high risk of developing serious and life-threatening COVID-19 infection. Prophylactic treatment with COVID-19 convalescent plasma may provide them the resistance they need to avoid serious COVID-19 manifestations while undergoing treatment for their cancer. Here we present an individual who presented to the hospital for evaluation of an abscess and was subsequently found to have both ALL and a positive test for COVID-19. He was prophylactically administered convalescent plasma.

Case Presentation

A thirty-five year old Hispanic male with the past medical history of only type 2 diabetes mellitus that was diagnosed one year ago presented to the emergency department of a tertiary care center with a three-day history of increasing fever chills associated with left buttock lesion which has been painful and draining, rated pain 8/10 increased with movement or touching. He also complains of associated nausea, vomiting, abdominal pain, diarrhea, chills, and sweats. A CT scan obtained in the emergency department showed no signs of abscess but rather demonstrated cellulitis. As such, the patient was started on vancomycin and zosyn. The patient was also found to be pancytopenic with peripheral blood showing 10% blasts which were concerning for leukemia. Hematology/oncology team was consulted. A bone marrow aspirate was confirmatory for Acute Lymphoblastic Leukemia (ALL) and it was recommended that the patient begin immediate chemotherapy. In the course of this work-up, the patient was also tested for SARS-CoV-2, the novel coronavirus responsible for COVID-19 infection. As the patient had risk factors that already put him at risk of developing severe or life-threatening manifestations of the virus in addition to the fact that he would become further immunocompromised as a result of his leukemia and impending chemotherapy, the COVID Convalescent Plasma research team was consulted to discuss the option of convalescent plasma therapy to provide him virus neutralizing antibodies in order to help ward off COVID-19 infection. It was decided that he met criteria for "at significant risk of developing severe disease" according to the Mayo Clinic Expanded Access Protocol and, following informed consent, he was transfused two units of type specific convalescent plasma. At time of hospital discharge, 61 days later, the patient still had detectable virus using a PCR-based test, however at no time during his hospitalization did he develop any disease manifestations. Specifically, he did not require oxygen therapy, did not develop shortness of breath, and did not lose sense of taste or smell. He had, on occasion, a low-grade fever, but this was attributed to his chemotherapy treatments as they were always a day or two after his chemotherapy infusions.

Discussion

The mortality rate in cancer patients infected with COVID-19 is 28%, more than double that of age and sex-matched controls [2,3]. The reason for this elevated death rate in cancer patients with COVID-19 isn't completely understood, but could likely be due to

***Corresponding author:** William R Hartman, University of Wisconsin School of Medicine and Public Health, 600 Highland Ave, Madison, WI, E-mail: wrhartman@wisc.edu

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the underlying pathology or the cancer chemotherapy treatments causing immunosuppression leaving these patients quite vulnerable to the effects of the virus. Patients with underlying hematologic malignancy are at even higher risks for SARS-CoV2 infection and disease progression [8]. Patients with leukemia often have pulmonary infection, fever and hemocytopenia, which are similar to the symptoms of COVID-19. The similarity in the symptoms may confuse the diagnosis. As such, every patient with new or suspected ALL should also have a concurrent COVID-19 test performed. The patient presented in this report came to the emergency department with a painful abscess that had developed on his buttocks. Subsequent laboratory tests performed during the workup were indicative of a diagnosis of Acute Lymphoblastic Leukemia. As he was a patient entering the hospital during the pandemic, a COVID-19 PCR test was ordered and came back as positive. Though he had no symptoms of COVID disease, neutralizing the SARS-CoV-2 virus became very important as he was at extreme risk for developing severe or life-threatening disease. As such, the patient was consented and received 2 units of type specific COVID-19 convalescent plasma as a prophylactic measure.

Convalescent plasma, the liquid part of blood containing antibodies extracted from a COVID-19 recovered patient is a safe [9] and potentially therapeutic treatment for hospitalized COVID-19 patients [10]. Its use as a prophylactic treatment to fight infection in an asymptomatic patient has not been established, though theoretically could provide an important immune boost for the asymptomatic patient who is a risk for becoming seriously ill with SARS-CoV-2. In the case presented in this manuscript, the patient was treated with COVID-19 Convalescent plasma and remained asymptomatic from are SARS-CoV-2 throughout his hospitalization, although did remain PCR-positive for the virus.

Conclusion

In patients with newly diagnosed hematologic malignancies and concomitant SARS-CoV-2 infection but requiring immediate chemotherapy treatment, COVID-19 convalescent plasma should be considered as a prophylactic measure to avoid becoming seriously ill with COVID-19 while immunocompromised.

Disclosure Statement

None of the authors have any conflicts, financial or otherwise, of interest or anything to disclose.

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Author Affiliations

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[1]*Department of Anesthesiology, University of Wisconsin-Madison School of Medicine and Public Health, Madison*

[2]*Department of Pathology and Laboratory Medicine, University of Wisconsin-Madison School of Medicine and Public Health, Madison*