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Managing patients who are immunocompromised during the COVID-19 pandemic

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Abstract: The COVID-19 pandemic has caused distinct challenges for immunocompromised populations, including disease and social management. This article presents strategies to prevent infection and promote quality of life in patients who are immunocompromised.

Keywords: COVID-19 pandemic, immunocompromised, mental health disorders, social distancing, social isolation

Case study

GK is a 64-year-old male with a 30-year history of systemic lupus erythematosus (SLE). He has worked as a long-haul independent truck driver for 40 years. He says he is in very good physical shape despite having a chronic illness. He has had few complications from the disease or the medications to treat

it. His routine medications are hydroxychloroquine (an antimalarial agent with anti-inflammatory and immunomodulatory effects), mycophenolate (an immunosuppressive agent), and azathioprine (an immunosuppressive antimetabolite). He says that staying in good shape and his medications keep him in remission. He has had SLE flares that

Case study imaging



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required infusions of belimumab (a B-lymphocyte stimulator [BLyS]-specific inhibitor), rituximab (a CD20-directed cytolytic antibody), and cyclophosphamide (an alkylating drug) to induce remission when his skin, kidneys, liver, and brain were targeted by the disease and caused increased inflammation.

GK says he gets exposed to very few people when traveling from coast to coast and feels protected from COVID-19 after receiving a primary vaccine series and the recommended boosters. He always wears a mask when getting gas, sits in secluded restaurant spaces, and takes off his mask only long enough to eat. While on the road, he developed sinus drainage and cough. He became increasingly fatigued and had an oral temperature of 99.2° F (37.3° C). When he arrived home, he had an oral temperature of 103° F (39.4° C);

a nonproductive, hacking cough; and slight shortness of breath. He was weak and had no appetite. His abilities to taste and smell were also absent. His spouse took him to his rheumatologist.

GK tested positive for COVID-19 by polymerase chain reaction and was hospitalized on the medical-surgical unit with an SpO₂ between 84% and 88% on room air. Supplemental oxygen at 2 L/minute by low-flow nasal cannula increased his SpO₂ to 94%. I.V. fluids were initiated for hydration. He lost 15 lb from anorexia and diarrhea in 2 weeks. Viral inflammation was manifested as bilateral pneumonia (see *Case study imaging*), an increase in C-reactive protein (CRP), and a decrease in white blood cell (WBC) count (see *Case study lab test results*). His rheumatologist prescribed high-dose I.V. methylprednisolone daily

for 3 days to reduce inflammation. He improved dramatically.

He was discharged home after 12 days in the hospital. He did not need home oxygen therapy. He recovered and retired from truck driving and secured a part-time position as a grocery store checker to be around people. The patient states, “I always wear my N95 mask and use hand sanitizer at the store. We also have a plexiglass window between customers and checkers. An average time spent with one customer ranges from 5 to 10 minutes.” He received his fourth booster, the most recent booster targeting the Omicron variant. He decided to take tixagevimab and cilgavimab for added protection because he does not have detectable antibodies to vaccination or previous COVID infection. He states: “My rheumatologist says I still have some protection without detectable antibodies. Working part-time does place me at some risk for another COVID-19. I take all the necessary precautions. I believe staying at home would be detrimental to my mental health. It’s been 2 years since I had COVID-19. I feel good and have a lot of energy.”

Introduction

The COVID-19 pandemic has caused distinct challenges for immunocompromised populations, including disease and social management.¹⁻³ In 2022, 2.7% of the US population (7 million people) was immunocompromised.⁴⁻⁶ While most of the community may feel that everyday activities are returning, COVID-19 continues to be a significant threat to immunocompromised populations.^{6,7} This article presents strategies to prevent infection and promote quality of life in patients who are immunocompromised.

A person who is immunocompromised is susceptible to infection from primary immunodeficiency disorder (PID) or secondary immuno-

Case study lab test results

Lab Test	Day 1	Day 3	Day 6	Day 9	Day 12	Day 15
WBC count (normal, 4.0-10.0 x 10 ⁹ /L)	3.1	3.3	3.6	3.8	4.2	5.1
CRP (normal, < 0.5 mg/dL)	8.2	7.4	3.3	2.4	< 0.2	< 0.2

deficiency disorder (SID).⁸⁻¹⁰ Genetic defects cause PID in humoral immunity (B-cell dysfunction), cellular immunity (T-cell dysfunction), complement, phagocytes, and natural killer cells.⁸⁻¹⁰ SID, sometimes referred to as acquired immunodeficiency, occurs more frequently than PID and is caused by defects in humoral and cellular immunity that moderately or severely compromise the immune system.⁸⁻¹⁰ SID is caused by certain disease processes and medical therapies that suppress lymphocytes and bone marrow.⁸⁻¹⁰ SID occurs in various degrees in splenectomy; radiation therapy; HIV; solid organ transplantation; stem cell transplantation; malignancy; and diseases of autoimmunity, kidneys, liver, heart, and lungs.⁸⁻¹⁰ The aging process, malnutrition, burns, and severe dermatologic disorders also weaken the immune system and make patients more vulnerable to infection.⁸⁻¹⁰

Patients who are immunocompromised are at significant risk for severe COVID-19 because they may not have mounted a sufficient antibody response from vaccination or previous severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection to protect them from other SARS-CoV-2 infections.⁴⁻⁶

History and physical assessment

Protecting a patient who is immunocompromised begins by obtaining a thorough health history including comorbidities; frequency of any infections; COVID-19 status; medication regimen(s); vaccination status, including against COVID-19;

and the patient's social support network.¹¹⁻¹⁴ The individual's home setting, activities of daily living, and occupation should be assessed to determine how the pandemic has impacted the individual's quality of life.¹¹⁻¹⁴

A head-to-toe physical assessment should be performed and correlated with any signs and symptoms of infection, such as fever, fatigue, cough, elevated CRP, and chest X-ray indicating pneumonia.^{11,12} Patients should also be assessed for signs and symptoms of venous thromboembolism secondary to inflammation, endothelial dysfunction, and platelet activation.¹² Calf or thigh erythema, tenderness, edema, and sudden onset of shortness of breath may indicate thrombosis.¹²

Vaccines, monoclonal antibodies, and antivirals

Evidence indicates that the best protection for patients who are immunocompromised is primary vaccination

and boosters.^{4,6,13,15} Vaccinating patients who are immunocompromised reduces their incidence of infection, hospitalization, and death even when they do not mount sufficient antibodies to the vaccine.^{4,6,13,15} Household members of individuals who are immunocompromised should also be vaccinated because then they are not as likely to spread the virus as individuals who are not vaccinated.^{4,6,13,15}

Misinformation regarding vaccines published on social media platforms and by news organizations has created skepticism and fear that lead to more COVID-19-related hospitalizations and deaths.^{7,16} According to the World Health Organization, vaccine hesitancy is an increasing threat to global health.^{7,16} People need to be vigilant in recognizing misinformation or disinformation and using evidence-based science as the impetus for vaccination against COVID-19.^{7,16,17} Misinformation is false information.

Tixagevimab and cilgavimab¹⁸⁻²¹

These medications are copackaged and administered in separate consecutive I.M. injections for the preexposure prophylaxis of COVID-19 in eligible individuals who are age ≥12 years and weigh ≥40 kg (88 lb). Eligibility includes:

Individuals are not currently infected with SARS-CoV-2 and have not had known recent exposure to an individual infected with SARS-CoV-2.

AND

Individuals with moderate-to-severe immune compromise due to a medical condition or receipt of immunosuppressive medications or treatments and may not mount an adequate immune response to COVID-19 vaccination.

OR

Individuals who received vaccination with any available COVID-19 vaccine, according to the approved or authorized schedule, and are not recommended to receive another due to a history of severe adverse reaction to a COVID-19 vaccine(s) and/or COVID-19 vaccine component(s).

It is not intended to deceive others. Disinformation is also false information, but it is intended to deceive others.^{7,16} Both types of false information lead to poor decision-making that compromises public health.^{7,16} For example, misinformation or disinformation that vaccination will cause COVID-19 may induce vaccine hesitancy.^{7,16} The evidence shows that vaccines are the best defense against COVID-19 for all people.¹⁷ Individuals who are immunocompromised may not produce detectable antibodies by lab analysis; however, they are still likely to have some antibody protection against COVID-19 after vaccination.^{16,17} Vaccination might prevent the need for mechanical ventilation and death.^{16,17}

The FDA issued Emergency Use Authorization for tixagevimab and cilgavimab, two monoclonal antibodies used as preexposure prophylaxis for immunocompromised patients and anyone allergic to vaccine ingredients if they meet eligibility requirements (see *Tixagevimab and cilgavimab*).¹⁸⁻²¹ These medications prevent severe COVID-19 by targeting the interplay between the surface spike protein and the human ACE-2 receptor, thus preventing the virus from entering the cells.¹⁸⁻²¹ These medications are effective against the Delta variant, have slightly less duration against the Omicron subvariants, and can be administered every 6 months.¹⁸⁻²¹ They do not take the place of being vaccinated in patients eligible for vaccination against COVID-19.¹⁸⁻²¹

Administration of antiviral agents such as I.V. remdesivir and oral ritonavir-boosted nirmatrelvir and molnupiravir (authorized for emergency use in December 2021) reduces hospitalization and death from COVID-19 by 90% in high-risk individuals if taken within 5 days of symptom onset related to COVID-19.⁷



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Transmission and environmental factors

Nurses can create a teaching plan from the information in this article to engage the patient in her or his care. Evaluate the patient's understanding by using the teach-back method.^{7,11}

Nurses should teach immunocompromised individuals and those around them that talking, coughing, and sneezing are the primary ways SARS-CoV-2 is transmitted.¹⁰⁻¹² Furthermore, staying at least 6 ft apart from other people in public settings helps reduce the virus' spread from vigorous exhalation, sneezing, and coughing.¹⁰⁻¹²

In addition to physical distancing, nurses should explain why wearing a secure-fitting high-filtration N95 or KN95 mask in social and public environments are effective strategies to prevent infection when coming into close contact with a potentially infected person.

Close contact occurs when a person is less than 6 ft away from an infected person (lab-confirmed or a clinical diagnosis) for a total of 15 minutes or more over 24 hours (for example, three separate

5-minute exposures for a total of 15 minutes) even when one or both people are wearing an N95 or KN95 mask.^{10-12,22} Nurses should encourage patients who are immunocompromised to physically distance themselves and limit time spent with people in public while wearing an N95 or KN95 mask.^{10-12,22} Nurses may demonstrate the proper fitting of a mask at an in-person or teleconference visit and ask the patient to demonstrate the procedure.^{7,11}

Home ventilation may be improved by opening doors and windows, using floor fans that direct air away from people and toward open windows, and using ceiling fans that distribute air evenly throughout a room. These strategies reduce the concentration of airborne viruses and pollutants.²³⁻²⁵ Home cooling and heating systems with a filter can help trap viruses.²³⁻²⁵

The nurse should teach the patient good hygiene practices, including washing their hands with soap and warm water or using an alcohol-based hand sanitizer after touching people, surfaces, and objects, and before and after touching their eyes, nose, or mouth.¹⁰⁻¹² The nurse should teach the patient respiratory hygiene and cough etiquette, including covering their nose and mouth when coughing or sneezing, followed by hand hygiene, and that they should avoid people who are sick or have been recently exposed to the virus.¹⁰⁻¹²

The nurse should encourage patients to keep apprised of COVID-19 rates from reliable sources, such as the local community health department or the CDC, and weigh the risks when considering travel.¹⁰⁻¹²

Psychosocial impact

Human beings need social interaction to foster a support network of individuals, groups, and communities; feel valued; have a sense

of belonging and inclusion; and promote optimal physical and mental health.^{3,14,25} The COVID-19 pandemic disrupted social interaction, especially among individuals with chronic illness, those who are immunocompromised, and older adults. This disruption led to increased anxiety, stress, depression, and loneliness from social isolation.^{1,3,14,16,25} Other risk factors for loneliness and social isolation include being immunocompromised, living alone, lacking a social support system, lacking access to healthcare services, and impoverishment.^{1,3,14,16,25} The nurse should screen a patient who is immunocompromised for depression secondary to social isolation.^{13,14,16,26}

To reduce social isolation, encourage patients who are immunocompromised to:^{2,3,11,14,23,26}

- **Explore face-to-face social activities, activities of daily living, and work while wearing a high filtration N95 or KN95 mask and physically distancing.** Ensure optimal ventilation in the home environment.

- **Get exercise in the home setting or outdoors.** Immunocompromised patients should wear a mask if it appears they will be exposed to others passing them while engaging in outdoor physical activities. Working out in a public gym always requires wearing a mask.

- **Embrace tools for communication and social interaction.** A landline telephone or cell phone with text messaging and video capabilities are effective ways for people to connect. Teleconferencing on a cellular phone or computer essentially provides face-to-face communication with others.

- **Join groups on social media platforms dedicated to others who are immunocompromised.** Many social media platforms have support groups where those who are immunocompromised can share life experiences.

- **Tune into TV stations** to stay informed about what is happening globally. It is also a way to watch movies and other forms of entertainment.

- **Obtain sufficient rest and sleep and consume a balanced diet** to promote physical and mental health. Avoid smoking cigarettes and limit alcohol consumption.

- **Pay attention to signs and symptoms indicating SARS-CoV-2 or other infections.** Individuals who are immunocompromised should continue monitoring their signs and symptoms as they recover from the disease. They are still susceptible to additional infections. Patients who are immunocompromised should report continued fatigue and mental status changes that may reflect the development of a chronic condition from the initial infection.

- **Keep appointments with the healthcare provider.**

- **Write in a journal.** Writing in a journal is a way to express feelings and make self-affirming statements. For example, sharing an example about social isolation from wearing a mask in public; a situation where there was an opportunity to teach a person in public what immunocompromised means; and the differences in protection from cloth face coverings, a surgical mask, and an N95 or KN95 respirators.

Conclusion

The general population will return to a degree of normality as the pandemic moves to an endemic phase. Individuals who are immunocompromised still live with the fear of being infected, having a severe illness, and dying even though they may have been vaccinated. Vaccination may not always provide these individuals with sufficient immunologic protection. They must navigate society with heightened vigilance by social distancing, wearing an N95 or KN95 mask, and limiting or avoiding

social gatherings while knowing that many people are not vaccinated. The best way to enhance the quality of life for individuals who are immunocompromised is for all populations globally to continue making strides to receive vaccination. ■

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