



# Coronavirus disease 2019 (COVID-19) complicated with human immunodeficiency virus (HIV) infection: a case report of nursing experience

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**Abstract:** In this paper, we report a case of coronavirus disease 2019 (COVID-19) complicated with human immunodeficiency virus (HIV) infection. The 50-year-old male patient had unexplained “intermittent fever with sore throat” on February 9th, 2020. Chest computed tomography (CT) showed bilateral multiple patchy opacities and ground-glass opacities. A COVID-19 RNA test was positive. After admission, additional laboratory tests revealed the following: white blood cell (WBC) count,  $4.7 \times 10^9/L$ ; neutrophil percentage, 85.1%; lymphocyte percentage, 12.3%; lymphocyte count,  $0.59 \times 10^9/L$ ; hypersensitivity C-reactive protein, 5.52 mg/L; four coagulation factors, +; D-dimer, 1.32 mg/L; and procalcitonin, normal. He was HIV (+). The patient was diagnosed with COVID-19 complicated with HIV infection. The healthcare team administered symptomatic care, including nasal oxygen, oseltamivir, Lianhua Qingwen capsule, moxifloxacin, ribavirin, and thymus faxin, as well as nutritional support, mental care, diet and life management, and close monitoring. Moreover, the team implemented strict disinfection and quarantine and occupational protection. The patient's temperature returned to normal and sore throat significantly improved by day 10, and COVID-19 RNA tests were negative on February 19th, February 21st, and February 22nd. Reexamination by chest CT on February 22nd showed significant absorption of inflammation. After rounds by the chief physician and consultation with specialists, the patient was released from quarantine and discharged on February 23rd per the *Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia* (Trial Version 6). Patients with COVID-19 and HIV infection face both physical and mental challenges. More attention should be paid to nursing as we understand more about COVID-19. We hope to share our nursing experience through this case.

**Keywords:** Coronavirus disease 2019 (COVID-19); human immunodeficiency virus (HIV); nursing; occupational protection; case report

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## Introduction

A number of viral pneumonia cases were detected in Wuhan, Hubei Province, China, beginning in December 2019, causing domestic and international concerns due to the rapid increase in caseload (1). On January 7th, 2020, Chinese researchers isolated and identified a novel

coronavirus (2019 nCoV) from a patient's respiratory secretions (2). On February 12nd, 2020, the World Health Organization (WHO) officially named the viral infection as coronavirus disease 2019 (COVID-19). COVID-19 may be transmitted via air, droplets, contact, or the gastrointestinal tract, with an incubation period of 1–14 days. It is highly

contagious. All age groups are susceptible, with family clustering and varied clinical manifestations. Available autopsy and pathology data show that CD4<sup>+</sup> T and CD8<sup>+</sup> T cells are significantly reduced in the spleen and lymph structure of COVID-19 patients (3).

Human immunodeficiency virus (HIV) is a retrovirus. It replicates rapidly to invade and destroy host CD4<sup>+</sup> T cells, causing multiple organ dysfunction, immune dysfunction, various opportunistic infections, benign or malignant tumors, and ultimately death (4).

At present, research on COVID-19 targeting specific populations, especially those infected with HIV was limited. Aiming to provide reference for COVID-19 and optimization of HIV prevention and treatment services for this population. On February 9th, 2020, we admitted a patient with COVID-19 and HIV infection. After admission, we performed comprehensive tests and exams and administered appropriate symptomatic care, including nasal oxygen, anti-infective therapy, antiviral therapy, and nutritional support. The patient's temperature returned to normal by day 10, and COVID-19 RNA tests were negative on February 19th, February 21st, and February 22nd. Chest computed tomography (CT) showed significant absorption of inflammation. On February 23rd, 2020, the patient was in stable condition without fever, chest tightness, or shortness of breath and was released from quarantine and discharged per the *Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia* (Trial Version 6). In this paper, we share our nursing experience in order to provide a theoretical basis for front-line healthcare workers, accelerate the recovery of patients with comorbidities, and improve the overall quality of nursing. In present research suggests that people with HIV are at increased risk of COVID-19 infection with severe consequences. The data are reported below. We present the following article in accordance with the CARE reporting checklist (available at <https://apm.amegroups.com/article/view/10.21037/apm-21-2613/rc>).

## Case presentation

A 50-year-old male patient was admitted to our hospital on February 9th, 2020, for suspected COVID-19 and “intermittent fever with sore throat for 14 days”. The patient was a Wuhan resident. He had unexplained fever (up to 38.0 °C) for the preceding 14 days, with chills (no shivering) and sore throat. He took “cold medicine” on his own for 2 days, with no significant improvement.

Chest CT at the local hospital showed bilateral multiple patchy opacities and ground-glass opacities, with a positive COVID-19 RNA test. He was transferred to our hospital for further treatment because the local hospital was full. After admission, additional laboratory tests revealed the following: white blood cell (WBC) count,  $4.7 \times 10^9/L$ ; neutrophil percentage, 85.1%; lymphocyte percentage, 12.3%; lymphocyte count,  $0.59 \times 10^9/L$ ; hypersensitivity C-reactive protein, 5.52 mg/L; four coagulation factors, +; D-dimer, 1.32 mg/L; and procalcitonin, normal. The local Center for Disease Control and Prevention reported that the patient was HIV (+). We administered symptomatic care, including nasal oxygen, oseltamivir, Lianhua Qingwen capsule, moxifloxacin, ribavirin, thymus faxin, nutritional support, bed rest, mental care, medication and diet management, and close monitoring. Moreover, we implemented strict disinfection and quarantine and occupational protection. The patient's temperature returned to normal in 3 days, and his sore throat significantly improved. COVID-19 RNA tests were negative on February 19th, February 21st, and February 22nd, and chest CT on February 22nd showed significant absorption of inflammation. After rounds by the chief physician and consultation with specialists, the patient was released from quarantine and discharged on February 23rd per the *Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia* (Trial Version 6).

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

## Nursing

### *Mental intervention*

Patients with COVID-19 and HIV infection must be quarantined due to the uniqueness of the disease itself. Moreover, online COVID-19-related information can bring additional work and life stress, causing patients to panic, become desperate, depressed, anxious, or ill, as well as tremendous mental stress. Therefore, it is important to provide effective mental interventions to help patients maintain a positive and optimistic attitude and actively

engage in clinical treatment. The head nurse and attending nurse should introduce themselves and address patients properly based on their age and sex to help patients feel at ease. During daily care, nurses should strive to build rapport with patients, meet the physical needs of patients, listen to patients, administer targeted mental interventions, and help patients relax, reduce stress and feel safe and at ease (5). Nurses should also educate patients on the emotional impact on immunity, how to manage emotions, COVID-19 and HIV and daily precautions to help patients understand their diseases, maintain an optimistic and positive attitude, and enhance their confidence. Later, nurses should add patients to the WeChat group for timely communication and comfort and encouragement.

### *Respiratory support*

COVID-19 patients have varying degrees of hypoxia, which may require respiratory support (per physician order) based on patient condition and tolerance. Patients should be closely monitored for state of consciousness, heart rate, breathing (rhythm, frequency, depth), and any associated complications, as well as pulse oxygen saturation or arterial blood gas analysis, in order to adjust oxygen flow, oxygen concentration, and the oxygen delivery method in a timely manner based on monitoring results and physician orders. Oxygen flow is generally 5 L/min or below for nasal oxygen and 5–10 L/min for a face mask (6). Notably, oxygen flow data in textbooks have no clinical relevance. Real-world oxygen flow data or graphs are more meaningful.

### *Condition monitoring*

COVID-19 patients have hypoxia, fever, cough, and other symptoms. Their conditions can change rapidly, requiring early detection, prompt reporting to physicians, and active medical interventions. Patients coinfecting with HIV and thus with low immunity must be closely monitored during treatment; this monitoring should include vital signs (temperature, breathing, and blood pressure), peripheral oxygen saturation, cough and sputum (sputum color, nature, and volume), stool (color, property, and volume), and skin condition. HIV patients usually have a poor skin condition, and redness, swelling, and tenderness tend to develop at pressure points. For oxygen therapy via face mask, Sanyrene should be applied and pressure points gently massaged as needed. The condition of the skin should be closely monitored and documented

promptly (5); details such as specific conditions at specific sites should be recorded.

### *Medication nursing*

Patients should take medications exactly as directed by their physician and should be closely monitored for efficacy and any adverse reactions. Moxifloxacin may cause nausea, gastrointestinal discomfort, and diarrhea. Oseltamivir may cause nausea, vomiting, and neurological adverse reactions, such as headache, abnormal behaviors, delusions, perceptual disturbance, delirium and, in severe cases, arrhythmia. Lianhua Qingwen capsule may cause nausea, vomiting, diarrhea, skin rash, dry mouth, and dizziness. Hormone therapy must be closely monitored because high-dose glucocorticoids have immunosuppressive effects and delay COVID-19 virus clearance. In addition, it is necessary to determine whether the clinical manifestations of the patients are caused by disease changes or adverse reactions to the drugs used.

### *Dietary nursing*

After admission, we developed a targeted nutritional plan based on the patient's needs, condition, available hospital supply, and nutrition assessment. The goal was to provide dietary guidance and ensure a balanced diet. The patient was closely monitored for his dietary intake (three meals a day) and was encouraged to feed himself/herself, have small, frequent meals and drink plenty of water. Oxygen therapy was not be interrupted, and the diet mainly included eggs, tofu, dairy products, fruit juice, vegetable juice, and rice noodles. Oral enteral nutrition (such as enteral emulsion) was given as needed. The patient received care before, during, and after each meal. The diets were recorded as needed. Any fasting or delayed meal due to special circumstances was communicated properly between shifts.

### *Occupational protection*

Both COVID-19 and HIV are infectious diseases, and healthcare workers must protect themselves and maintain a good attitude when treating patients with these diseases. They should ensure that their own skin is intact and implement three-level protection when entering a contaminated work area. Moreover, it is important to set up an occupational exposure first-aid station in the contaminated area and evaluate the station and dispose of

contaminated waste according to the hospital's disposal process for occupational exposure to infectious diseases (version 2).

### COVID-19

Any required medical monitoring should last at least 14 days. After 14 days, if the patient's temperature is normal, without respiratory symptoms, quarantine can be lifted. In the case of fever or cough during quarantine, blood tests, COVID-19 RNA tests, and chest CT should be performed. Suspected or confirmed cases should receive further treatment based on the standard of care.

### HIV

In the event of HIV exposure, healthcare workers should be evaluated by an expert panel. Any healthcare worker with potential risk of HIV infection should take blockers within 2 hours of exposure (no later than 72 hours). The recommended regimen is tenofovir (TDF) + lamivudine (3TC) or emtricitabine (FTC) + lopinavir/ritonavir (LPV/r).

During invasive diagnoses, treatments, or procedures, nurses should ensure adequate lighting to minimize the risk of pricks or scratches by sharp objects such as needles and blades. Used sharp objects should be placed in a designated container with a clear label and disposed of according to specific procedures to prevent physical injury to others. At the end of infusions, the needle should be removed straight with positive pressure (that is, with an active infusion line) to flush the needle, reduce residual blood at the tip, and prevent excess blood exposure in case of accidental injury (6). When leaving a contaminated area, healthcare workers should strictly follow established procedures: wash hands → enter undressing station 1 → wash hands → apply general disinfectant spray → wash hands → remove protective clothing → wash hands → remove face screen → wash hands → remove mask → wash hands → remove cap → wash hands → remove shoe covers → wash hands → remove gloves → wash hands → enter buffer zone → wash hands → enter undressing station 2 → wash hands → remove shoe covers → wash hands → remove protective clothing → wash hands → remove gloves → wash hands → remove goggles → wash hands → remove cap → wash hands → remove mask → wash hands → remove gloves → wash hands → enter buffer zone → wash hands → remove shoe covers → wash hands → enter changing station 2 → wash hands → remove mask → wash hands → remove sock covers → wash hands → change into slippers → wash

hands → enter the shower room, remove scrubs, and take a shower → enter changing station 1 → change into personal clothes → change shoes → wash hands → enter the clean area.

### *Final disinfection*

Once the patient received his discharge notice, nurses educated the patient on do's and don'ts after discharge and instructed the patient to collect all necessary items and clothes for disinfection, UV disinfection, and chlorine-containing disinfectant spray. All disposable items used during the hospital stay and items contaminated with the patient's blood and body fluids were placed in a double-layer yellow plastic bag that was labeled with HIV and sent to the medical waste treatment center to be destroyed by designated personnel. Equipment used during treatment, bedside tables, and handrails were wiped with chlorine-containing disinfectant. The bed unit was disinfected with a special disinfection machine, and the floor was sprayed with chlorine-containing disinfectant and then mopped. The ward did not admit other patients for 24 hours after completing the disinfection protocol.

### *Discharge guidance*

Before discharge, the patient took a shower, changed into disinfected clothes, and then quarantined for additional 14 days at a designated location in Wuhan. The patient was instructed to rest and eat a balanced diet, report symptoms such as fever and cough promptly, and undergo chest CT, liver tests, and blood tests as needed.

### Discussion

COVID-19 patients complicated with HIV infection often face both mental challenges (anxiety, tension, fear, pessimism, and desperation) and physical challenges (fever, multiple patchy opacities and ground-glass opacities in the lungs, positive COVID-19 RNA tests, and positive HIV test). According to the Guidelines (3), no specific antiviral drugs are available, and current treatments mainly include symptomatic care and immune support. Patients may receive prescribed oxygen therapy (to improve hypoxia), antiviral therapy, anti-infective therapy, and immune support, as well as close monitoring for any change in condition, treatment response, and adverse reactions. Mental interventions play an important role in enhancing patient confidence and

encouraging patients to maintain an optimistic attitude and actively engage in treatment. Diet management is also very important. A targeted nutrition plan should be developed to ensure a balanced, regular diet that mainly includes eggs, milk, meat, soy products, vegetables, and fruits, as well as enteral nutrition preparations if needed. In addition, adequate rest combined with appropriate physical activity helps enhance immunity and accelerates recovery.

Healthcare workers must protect themselves during their work; stay vigilant when treating patients with HIV and COVID-19; strictly implement disinfection and quarantine and occupational protection; follow standardized diagnosis and treatment procedures; and familiarize themselves with emergency responses and procedures in the event of occupational exposure. Wash hands frequently when caring for patients, and keep the workplace clean with Windows open for ventilation. Try to avoid unprotected close contact with patients. Moreover, we will follow the layer by layer reporting and strengthen the public health security system for improving emergency management. In addition, they should learn and receive training on disease-related information. Once a patient is scheduled to be discharged, healthcare workers should follow infectious disease procedures to prevent disease transmission and spread in order to minimize the risk of occupational exposure. They should also perform final procedures that include thoroughly washing, disinfecting, or treating items and bed units used by patients and prepare the ward for new patients (to be admitted at least 24 hours after completion of the disinfection protocol).

Furthermore, it is important to instruct patients to quarantine at the designated location according to local regulations. Patients should also be instructed to rest and eat a balanced diet in order to enhance physical fitness. After a 14-day quarantine at the designated location, patients may go home; they should reduce outdoor activities, take care of others around them, maintain a regular schedule, and persevere until the pandemic has subsided. The implementation of multi-specialty coordinated individual holistic care plan for the rescue work of COVID-19 with AIDS patients can detect the changes of the condition timely. Moreover, safe nutrition, rehabilitation care and all-round humanistic care were provided to improve the rehabilitation effect of therapy, which is critical to down-regulate the mortality rate.

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## Footnote

*Reporting Checklist:* The authors have completed the CARE reporting checklist. Available at <https://apm.amegroups.com/article/view/10.21037/apm-21-2613/rc>

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*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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