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SARS-CoV-2 and Crimean-Congo hemorrhagic fever virus coinfection: A case report and review of the diagnostic challenges

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SARS-CoV-2 and Crimean-Congo hemorrhagic fever virus coinfection: A case report and review of the diagnostic challenges

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Abstract

The coronavirus disease 2019 (COVID-19) has overshadowed other infectious diseases due to its prolonged pandemic. This has resulted in seasonal or endemic infections coinciding with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), like Crimean-Congo hemorrhagic fever virus (CCHFV). Here, we reported that a 36-year-old male shepherd presented with fever, myalgia, and abdominal pain diagnosed with CCHFV and SARS-CoV-2 coinfection.

Keywords : SARS-CoV-2; COVID-19; CCHF; Coinfection

Key Clinical Message

The coinfection of SARS-CoV-2 with any other pathogen is likely and inevitable. Thus, a high index of suspicion is needed in such conditions, and accurate diagnostic testing should be employed to distinguish the differential diagnoses.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has been so strange and challenging that many other infectious diseases have been overlooked. The relatively prolonged period of this pandemic has led to the coincidence of several seasonal or endemic infections with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)(1). As everybody knows, the summer season, from June to September, is when most Crimean-Congo hemorrhagic fever (CCHF) cases are reported. As diseases by SARS-CoV-2 and CCHF

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virus (CCHFV) share many clinical and paraclinical features, these two infections are likely misdiagnosed. However, the probability of COVID-19 and CCHF coinfection should always be considered in consistent clinical and epidemiologic conditions(2). Here we described a CCHFV and SARS-CoV-2 coinfection with overlapping symptoms.

Case presentation

A 36-year-old male shepherd living in rural areas of Kermanshah, Iran, presented to the emergency department with fever, myalgia, and abdominal pain for 3 days prior to admission. His initial complaints did not mention cough, dyspnea, hematemesis, melena, or hematuria. His medical history was insignificant. Physical examination was normal, and his vital signs were stable except for a low-grade temperature at admission. His oxygen saturation was 96% on ambient air. Due to the COVID-19 pandemic and suspicion of SARS-CoV-2 infection, he was immediately put in an isolation room, his nasopharyngeal swab specimen was sent for a SARS-CoV-2 RT-PCR test, and he underwent a computed tomography (CT) scan of the chest. The patient was started on favipiravir, dexamethasone, and heparin. No pulmonary evidence of SARS-CoV-2 was detected in the lung imaging, and his laboratory tests were in the normal range, except for an elevated CRP level. However, within three days of hospitalization, he developed progressive thrombocytopenia and increased elevated transaminases and LDH. However, coagulation tests were not impaired, fortunately.

Moreover, he developed a petechial rash on his buttocks. Anticoagulant therapy was stopped, and platelet infusion was started for him. Considering the summer season, the patient's occupation, epidemiologic features, bleeding syndrome, severe thrombocytopenia, and elevated liver enzymes, this patient was highly suspected of CCHF. Hence, a blood PCR test for CCHFV was also requested, and he was started on ribavirin with dosing according to WHO recommendations and the national clinical protocol of Iran for CCHF. The interesting issue was the result of his positive PCR tests for both SARS-CoV-2 and CCHFV. The patient's condition improved, and was discharged 8 days after admission.

Discussion

Crimean-Congo hemorrhagic fever (CCHF) is a life-threatening zoonosis resulting from infection with Crimean-Congo hemorrhagic fever virus (CCHFV), belonging to the Nairovirus genus of the Bunyaviridae family. Hyalomma ticks and livestock transmit this zoonotic infection through exposure to infected body fluids. Iran is ranked second after Turkey for CCHF cases in the Eastern Mediterranean Region of the World Health Organisation (WHO)(3). The western areas of Iran are endemic for the CCHF, with summertime being the most active season due to increased tick bites. On the other hand, the COVID pandemic has led to an increased rate of SARS-CoV-2 coinfections with any other pathogen, including nairoviruses like CCHFV(4, 5). In the current era of SARS-CoV-2 dominance, outbreaks of CCHF can be an essential health threat in endemic countries like Iran, leading to worsened outcomes and increased mortality.

These coinfections can cause many challenges in diagnosis and management as clinical manifestations sometimes overlap. The similarities between CCHF and SARS-CoV-2 infection presentations make early diagnosis difficult, mainly if the clinical findings are inconclusive. However, understanding the similarities and differences between these two infections can help clinicians differentiate them in a timelier manner(6).

From an epidemiological view, SARS-CoV-2 is a pandemic worldwide, while CCHF is distributed from the Black Sea to southern Africa, most heavily concentrated in Turkey, Iran, and other Mediterranean countries(7). CCHF is usually demonstrated in farmers, veterinarians, and slaughterhouse employees, while SARS-CoV-2 is specified to have no occupation.

The transmission mode is airborne in COVID-19, while CCHFV is mainly spread through bloodborne and sometimes aerogenic transmission(8). The diagnosis of CCHF can be troublesome without a history of tick bites. Our patient also did not recall a tick bite. However, his occupation and epidemiological and geographical characteristics led us to suspect CCHF.

The incubation period for both infections ranges from 2-14 days. Moreover, some of the manifestations of the prehemorrhagic phase of CCHF are similar to prodromal features of SARS-CoV-2 infection, including fever,

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chills, myalgia, arthralgia, and malaise. However, with disease progression after about one week, clinical findings may become more apparent and different from each other, as SARS-CoV-2 infection may lead to respiratory symptoms such as coryza, cough, and shortness of breath. At the same time, CCHF may enter the hemorrhagic phase, manifesting as petechiae, ecchymoses, hematemesis, melena, hematuria, epistaxis, and hemoptysis. However, bleeding diatheses occur if disseminated intravascular coagulation (DIC) complicates COVID and only in severe and critical cases. Both conditions can end in DIC and multiorgan failure if not treated effectively(9, 10).

Typical laboratory abnormalities in SARS-CoV-2 infection include elevated D-dimer, ferritin, and CRP levels and lymphopenia, while CCHF predominantly manifests as thrombocytopenia and impaired liver function and coagulation tests(11, 12).

Diagnosis of CCHF is suspected based on clinical and epidemiologic findings and confirmed by identifying viral RNA by RT-PCR or the presence of serologic evidence of recent exposure to the virus, including IgM and IgG detection by sensitive and specific methods like enzyme-linked immunosorbent assay (ELISA) (13). In contrast, COVID-19 is suspected by clinical findings and confirmed by PCR or chest imaging. It should be noted that high-resolution computed tomography (HRCT) has a special place in diagnosing PCR-negative cases of SARS-CoV-2 infection(14). SARS-CoV-2 and CCHFV infections may or may not lead to pulmonary involvement. Nonetheless, various lung radiographic features might be demonstrated if this occurs. Ground-glass opacities and multiple pulmonary infiltrates are the characteristic features of chest CT in COVID-19, while a mild case of CCHF spares the lungs, and ground-glass opacity is only demonstrated in the settings of CCHF if alveolar hemorrhage intervenes(15-19). Pulmonary embolism is a common finding in COVID-19, while this complication only rarely occurs in the settings of CCHF(20, 21). Acute respiratory distress syndrome (ARDS) may occur in the late stages of both infections, indicative of a poor prognosis(22).

Supportive care is the cornerstone of treatment for both SARS-CoV-2 and CCHFV infections. However, antiviral therapy may be effective in some conditions, especially in the early or viremic phase of these two conditions. The efficacy of ribavirin in the management of CCHF is controversial even in the early stages, while antiviral agents like favipiravir and remdesivir have been successfully applied to control SARS-CoV-2 infection in the early days of diagnosis(23, 24). Nevertheless, favipiravir has been utilized to manage CCHFV infection in animals(5). Therefore, the administration of favipiravir in our patient could have done a favor to both infections and accelerated the improvement course of both SARS-CoV-2 and CCHFV. If not contraindicated, anticoagulation is recommended for severe to critical cases of COVID-19, while this therapeutic option is usually avoided in CCHF, primarily if severe thrombocytopenia or DIC occurs. Moreover, thromboconcentrate replacement therapy, cryoprecipitate, and albumin are frequently administered to manage CCHF(25). The fatality rate of CCHF is much higher than COVID-19, approximately 30%, vs. up to 10% in severe cases(26, 27).

Our patient's primary clinical findings were consistent with COVID-19, while later manifestations and laboratory test results suggested CCHF. The ultimate diagnosis was based on medical tests proving SARS-CoV-2 and CCHFV coinfection. To our knowledge, this was among a few cases of SARS-CoV-2 and CCHFV coinfection reported so far.

Conclusion

This case report and similar ones show that the coinfection of SARS-CoV-2 with any other pathogen is likely and inevitable. Thus, a high index of suspicion is needed in consistent conditions, and accurate diagnostic testing should be employed to distinguish the differential diagnoses.

Competing Interest

None.

Acknowledgments

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versity of Medical Sciences and Infectious Diseases and Tropical Medicine Research Center, Health Research Institute, Babol University of Medical Sciences, Iran.

Written informed consent statement

Written informed consent was obtained from the patient for publication of the current case report.

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