

CASE REPORT

Clinical misdiagnosis of influenza infection with a confusing clinical course: A case report

Arefeh Babazadeh¹  | Zeinab Mohseni Afshar²  | Mohammad Barary³  |
Rezvan Hosseinzadeh⁴  | Soheil Ebrahimpour¹ 

¹Infectious Diseases and Tropical Medicine Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran

²Clinical Research Development Center, Imam Reza Hospital, Kermanshah University of Medical Sciences, Kermanshah, Iran

³Student Research Committee, Virtual School of Medical Education and Management, Shahid Beheshti University of Medical Sciences, Tehran, Iran

⁴Student Research Committee, Babol University of Medical Sciences, Babol, Iran

Correspondence

Rezvan Hosseinzadeh, Student Research Committee, Babol University of Medical Sciences, Babol, Iran.
Email: r.hosseinzadeh@mubabol.ac.ir

Soheil Ebrahimpour, Infectious Diseases, and Tropical Medicine Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran.
Email: drsoheil1503@yahoo.com

Abstract

A 32-year-old woman with a history of hypothyroidism and major depressive disorder was admitted with severe weakness and somnolence. She had tachycardia and hypotension, indicative of severe dehydration, and was treated with a vasopressor and sodium bicarbonate, but her clinical manifestations deteriorated. A high-resolution computed tomography (HRCT) scan showed a patchy ground glass appearance with interlobular septal thickening, suggesting pneumonia. Reverse transcription-polymerase chain reaction (RT-PCR) was requested for the influenza A virus (IAV), which was positive. The patient was treated with oseltamivir and discharged with improved clinical symptoms.

KEYWORDS

COVID-19, diagnostic errors, H1N1 subtype, human, influenza A virus, influenza

1 | INTRODUCTION

Influenza A virus (IAV) is a single-stranded RNA virus of the Orthomyxoviridae family that causes influenza A disease.¹ Influenza A is an acute viral disease with a high epidemic that can occur with mild to severe symptoms, with its first effects can be seen in the respiratory system.² Influenza was first seen in 1918, killing 50–100

million people in the first year of the pandemic.³ A strain called H1N1 first caused a pandemic worldwide in 2009 in California, North America, killing 100,000–400,000 people.^{2,4} On June 11, 2011, the World Health Organization (WHO) declared H1N1 influenza, a seasonal swine flu virus, a global pandemic.⁵

Due to its contagiousness, this disease can also cause diseases such as pneumonia and bronchitis in children;

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10% of hospitalized patients and 3% of deaths caused by this disease are children under 18 years.⁴ This disease can be transmitted from one person to another through exposure to contaminated surfaces or large contaminated respiratory droplets.⁶ Symptoms of the disease appear 1 week after exposure to the virus and can include headache, cough, sore throat, myalgia, fatigue, runny nose, fever, shortness of breath, diarrhea, and vomiting. Among the complications of this disease, we can mention bacterial infections, respiratory failure, myocarditis, rapidly progressive disease of the lower respiratory system, neurological complications, and acute respiratory distress syndrome (ARDS) with resistant hypoxemia. This disease can also be caused by worsening the underlying disease.⁶

Coronavirus disease 2019 (COVID-19) is a viral disease first reported in 2019 and became a global pandemic. This disease is similar to influenza because of its respiratory symptoms and complications.⁷ This report examines a patient with influenza A H1N1 with similar symptoms to COVID-19.

2 | CASE PRESENTATION

A 32-year-old woman with a history of hypothyroidism and major depressive disorder (MDD) was admitted to the infectious disease ward. Her symptoms began 3 days ago with fever, chills, loss of appetite, myalgia, and dry coughs, which gradually became productive. Her fever got under control with medical therapy. Then, she presented with vomiting and watery secretory diarrhea. Also, according to the patient's family, she had an episode of bloody diarrhea, followed by hypotension and tachycardia, before her admission. Finally, she was referred to the hospital with severe weakness and decreased level of consciousness. Her body temperature was 37°C, blood pressure was 77/42 mmHg, heart rate was 136 beats/min, and respiratory rate was 20 breaths/min. On physical examination, she had evidence of severe dehydration. The patient's drug history included biperiden and perphenazine.

The patient underwent fluid therapy at the beginning of hospitalization, but her clinical manifestations deteriorated. Due to tachycardia, an echocardiography was performed for the patient, which was normal. Tests were performed for the patient, as shown in Table 1. Due to her resistant hypotension to hydration, the patient was treated with a vasopressor. Although her creatinine was in the normal range (0.8 mg/dL, normal range: 0.6–1.1 mg/dL), the patient's urine volume was low, and its color was extremely dark. Then, an arterial blood gas analysis was requested for the patient, in which her pH was 7.16 (normal range: 7.35–7.45). Therefore, the patient was treated with sodium bicarbonate.

TABLE 1 Clinical and laboratory characteristics of the patient on admission and within the hospitalization.

Laboratory marker	Day after admission									
	First day	Second day	Fourth day	Fifth day	Seventh day	Eighth day	Ninth day	Tenth day	Eleventh (discharge) day	
WBC count (per μ L)	-	3300 ¹	4300	-	4000	3800	5600 ²	4000	4000	
Platelet count (per μ L)	-	79,000	74000 ¹	-	86,000	164,000	277,000	292000 ²	77,000	
Hemoglobin (g/dL)	-	11.2 ²	11.1	-	10.1 ¹	11	11.1	10.2	10.9	
INR	-	-	1.2	1.1 ¹	-	1.2	1.2	1.3 ²	1.2	
PTT (s)	-	-	40	35	-	38	30 ¹	30 ¹	46 ²	
CRP (mg/L)	152 ²	135	15	-	5 ¹	-	-	-	-	
ESR (mm/h)	-	83 ²	40	-	-	56	-	33 ¹	54	
BUN (mg/dL)	8 ¹	8 ¹	13.1	13.6 ²	11.8	-	-	-	-	
Cr (mg/dL)	0.8 ²	0.7	0.6	0.8 ²	0.5 ¹	-	-	-	-	

Note: Laboratory findings under the hospitalization period column represent ¹nadir or ²peak values of that specific paraclinical test.

Abbreviations: BUN, blood urea nitrogen; Cr, creatinine; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; INR, international normalized ratio; PTT, partial thromboplastin time; WBC, white blood cell.

Moreover, the patient was admitted to the intensive care unit (ICU) due to the lack of improvement in symptoms. In the ICU, the patient was diagnosed with refractory septic shock and treated with broad-spectrum antibiotics, including vancomycin, meropenem, and corticosteroids prescribed for resistant hypotension, alleviating her symptoms and improving her general condition. After the patient regained consciousness and the color of her urine became normal, corticosteroids and vasopressors were discontinued. Due to frequent coughs, the patient was requested a high-resolution computed tomography (HRCT) scan, in which a patchy ground glass appearance with interlobular septal thickening was observed. The next day on her second HRCT, consolidation in the posteromedial of inferior lobes was observed.

Based on the acquired data, the differential diagnosis included gastroenteritis, drug or food poisoning, and viral pneumonia. First, with the suspicion of drug poisoning, a urine drug screening was requested for the patient, which was normal. A complete abdomen and pelvis ultrasound was requested, which was also to rule out gastroenteritis. With suspected COVID-19, D-dimer and reverse transcription polymerase chain reaction (RT-PCR) was requested for acute respiratory syndrome coronavirus 2 (SARS-CoV-2). RT-PCR was negative, and the D-dimer was normal (566.3 ng/mL). Then, due to the beginning of the influenza season, RT-PCR for some influenza viruses was requested, which was positive for IAV subtype H1N1.

According to the diagnosis of IAV subtype H1N1, the patient has been treated with oseltamivir capsules 75 mg twice daily for 7 days. Finally, she was discharged with improved clinical symptoms and two negative RT-PCR tests for H1N1.

3 | DISCUSSION

The H1N1 IAV was first confirmed in Mexico in 2009. This disease has several complications, the most important of which are respiratory complications, such as ARDS.⁸ In 2019, the SARS-CoV-2 virus was reported to be similar to the H1N1 influenza virus in many aspects. COVID-19 could exert harmful effects on most body organs, the most important of which are respiratory complications, such as severe pneumonia and ARDS.^{8,9} This case report examines the clinical similarities and differences between COVID-19 and influenza.

Comparing the age groups of patients with both diseases in previous studies showed that more than 73% of patients with COVID-19 were over 40 years old, while more than 40% of patients with H1N1 influenza were

in the age group of 10–18 years.¹⁰ Moreover, most of the COVID-19 patients were male.⁹ Our patient was a 32-year-old woman. COVID-19 usually has a more extended incubation period, between 2 and 14 days, while the maximum incubation period of influenza is reported to be 7 days.¹⁰ In our patient, symptoms appeared within 2–3 days. The exact initial manifestations of both diseases, such as fever, cough, sore throat, fatigue, myalgia, runny nose, headache, and digestive problems, are present.¹⁰ Initial symptoms of fever, cough, myalgia, diarrhea, and vomiting were observed in our patient. The results of laboratory tests show lymphopenia in both diseases, with the difference that the proportion of lymphocytes in patients with COVID-19 is higher than in patients with influenza.¹¹ Our patient's lymphocyte count was around 17% during hospitalization.

Studies have shown that both diseases can cause the patient to be hospitalized in the ICU. Still, due to the more severe complications of COVID-19, the affected patients are hospitalized longer in the ICU. In most cases, they may require mechanical ventilation.¹² Our patient was transferred to the ICU a few days after hospitalization due to a lack of improvement but did not require mechanical ventilation. Both diseases have a vitreous opacity comparing their radiographic findings, which could be observed bilaterally in the lower lobes in COVID-19. Influenza involves all the lobes and is observed more diffusely.¹³ In our patient, vitreous opacity was observed in a scattered form in all lobes. The RT-PCR test can be the gold standard for diagnosing both diseases.¹⁴ We also requested RT-PCR to confirm the patient's diagnosis, which was negative for COVID-19 and positive for the H1N1 influenza virus.

Due to the similar transmission routes in both diseases, similar prevention methods such as washing hands with soap and water, disinfecting surfaces and hands with alcohol, quarantining the sick person in the family, social distancing in the community, and wearing a face mask can be utilized.¹⁰ Moreover, antiviral treatments and corticosteroid pulses can be used considering the virality of both diseases. Our patient was also treated with oseltamivir for 1 week.

4 | CONCLUSION

Considering all of the points made in this report regarding the differences and similarities between COVID-19 and influenza, as well as the fact that the COVID-19 pandemic is not yet over in many countries, clinicians should initially treat patients based on their signs and symptoms before attempting to differentiate between the two diseases using high-precision diagnostic tests, such as RT-PCR.

AUTHOR CONTRIBUTIONS

Arefeh Babazadeh: Data curation; writing – original draft. **Zeinab Mohseni Afshar:** Data curation; writing – original draft. **Mohammad Barary:** Data curation; writing – original draft; writing – review and editing. **Rezvan Hosseinzadeh:** Data curation; writing – original draft. **Soheil Ebrahimpour:** Conceptualization; supervision.

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CONFLICT OF INTEREST STATEMENT

All authors have no relevant financial interests to be declared.

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None.

DATA AVAILABILITY STATEMENT

The corresponding author's data supporting this study's findings are available upon reasonable request.

CONSENT


Written informed consent was obtained from the patient to publish the current case report.

ORCID

Arefeh Babazadeh  <https://orcid.org/0000-0002-1362-7203>

Zeinab Mohseni Afshar  <http://orcid.org/0000-0002-1085-374X>

Mohammad Barary  <https://orcid.org/0000-0001-8733-9370>

Rezvan Hosseinzadeh  <https://orcid.org/0000-0001-9399-3854>

Soheil Ebrahimpour  <http://orcid.org/0000-0003-3204-0448>

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