SHORT COMMUNICATION

Co-infection between the severe acute respiratory syndrome coronavirus 2 and the influenza Type B in Isfahan, Iran

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Background: Some studies have been reported the rates of co-infection between severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and influenza virus in the different regions. In this study, we report the co-infection rates between SARS-CoV-2 and influenza type B in Isfahan, Iran. **Materials and Methods:** All patients with a definite diagnosis of coronavirus disease 2019 (COVID-19) from Isfahan COVID-19 registry (I-core) study were enrolled from February 2020. **Results:** Of the 1639 laboratory COVID-19 confirmed in Isfahan province, only two persons were positive for Influenza B from Isfahan COVID-19 registry (I-core). Both patients were symptom-free after 3 months' follow-up. **Conclusion:** During influenza season, differentiating other causes of respiratory illness from COVID-19 is difficult, because common clinical manifestations of COVID-19 mimic those of influenza. It seems that evaluating for co-infection with different types of influenza viruses in patients with specific settings should be considered.

Key words: Coronavirus, coronavirus disease 2019, influenza

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) outbreak, which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been declared a global pandemic by the World Health Organization.[1] The common symptoms of COVID-19 include fever, dry cough, dyspnea, fatigue, or myalgia. Although organ dysfunctions such as acute respiratory distress syndrome and even death could occur in severe cases,[2] computed tomography (CT) images of COVID-19 patients show ground-glass opacities (GGOs), multifocal patchy consolidation, and/or peripherally distributed interstitial changes.[3]

Influenza virus, a common virus occurring in winter, is similar to COVID-19 in terms of transmission and clinical characteristics.[4] The typical chest CT presentations for influenza virus pneumonia are also close to those for COVID-19.[5]

Some studies have been reported the rates of co-infection between SARS-CoV-2 and influenza virus in different regions.[6,7] We aimed to report the co-infection rate between SARS-CoV-2 and influenza Type B, patient characteristics, laboratory findings, and their follow-up after 3 months. This is the only study that presents the co-infection rate between SARS-CoV-2 and influenza Type B in Isfahan, Iran.

MATERIALS AND METHODS

All patients with probable cases of COVID-19 in Isfahan, a province in the middle of Iran, were enrolled in I-core

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study. I-core design and methodology were published elsewhere.[8] I-core study has been launched for the data collection during routine clinical cares of COVID-19 patients from February 2020. In our study, all patients with definite COVID-19 diagnosis from I-core study were enrolled. The diagnosis of COVID-19 was confirmed when the real-time reverse transcription-polymerase chain reaction (rRT-PCR) for SARS-CoV-2 in the nasopharyngeal swab specimen was positive. For all positive PCR patients, another nasopharyngeal swab specimen were obtained for the evaluation of influenza Type B viruses.

Statistical analysis

The obtained data were entered into the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) software version 23. Descriptive data were presented in mean, standard deviation, percentages, and absolute numbers.

RESULTS

Of the 1639 laboratory COVID-19 confirmed in Isfahan province (except Kashan and Aranobidgol) by March 26, 2020, only two persons were positive for influenza B from I-core registry.

The first case was a 76-year-old male which was presented with dyspnea and fever. He suffered from diabetes mellitus, hypertension, congestive heart disease, and chronic kidney disease (CKD). He had no previous history of contact with known coronavirus-infected person. He also complained of orthopnea and body pain. His vital signs and routine blood tests on admission are shown in Table 1. His chest radiography on the 1st day of admission showed diffuse infiltrates in both lungs. His swab sample was positive for both influenza Type B virus and rRT-PCR for SARS-CoV-2. After confirmation of Corvid-19, he referred to one of focal coronavirus hospitals in Isfahan city in Iran. The patient initiated on intravenous (IV) levofloxacin 750 mg/day, oral oseltamivir 75 mg/twice daily, and oral hydroxychloroquine 400 mg/twice daily for 1 day, and 200 mg/twice daily for 4 days. He also received IV methylprednisolone 25 mg/twice daily and IV furosemide 40 mg/twice daily. Finally, he was discharged with 6 days hospitalization duration. After 3 months follow-up, he did not have any complaint.

The second case was a 62-year-old female who admitted to one of the local hospitals in Isfahan province (Naeein) with fever, dry cough, hemoptysis, muscular pain, and respiratory distress. She had no underlying disease. She had no previous history of contact with known coronavirus-infected person. Her physical examinations and routine blood tests on admission are summarized in Table 1. Her high-resolution CT scan showed bilateral multiple patchy GGOs. Similar to patient no. 1, her swab sample was positive for the influenza Type B viruses and samples for SARS-CoV-2 on RT-PCR assays were positive, as well. The patient was also started on oral hydroxychloroquine 400 mg/twice daily for 1 day and 200 mg/twice daily for 4 days and oral oseltamivir 75 mg/twice daily for 5 days. She also received IV ceftriaxone 1 g/twice daily at the beginning then it was discontinued. Finally, she was discharged after 4 days hospitalization. After 3 months follow-up, she was well with no complaint.

Table 1: Clinical characteristics and laboratory tests of both cases

	Case 1	Case 2
Clinical examination on admission		
Blood pressure (mm Hg)	158/100	115/78
Body temperature (°C)	38	38.9
Pulse rate (beats/min)	115	110
Respiratory rate (breaths/min)	36	34
Oxygen saturation (while breathing ambient air)	85%	88%
Laboratory findings		
Leukocyte count (cells/L)	$8.4\times10^{9\#}$	$3.5\times10^{9*}$
Lymphocyte count (cells/L)	$1.81\times10^{9**}$	$2.10\times10^{9\ddagger}$
Platelet count (k/ul)	217	210
Hemoglobin (g/dl)	9.2	13.5
Hematocrit (%)	29.3	39.2
ALT (U/ml)	37	21
AST (U/ml)	41	27
Erythrocyte sedimentation rate after 1st h	130	43
CRP	++ positive	Weakly positive
Creatinine (mg/dl)	3	0.8
BUN (mg/dl)	103	17
Sodium (mmol/L)	140.7	136.5
Potassium (mmol/L)	5	4.4
LDH (U/L)	890	500
Ferritin (ng/ml)	860	463
D-dimer (ug/ml)	N/A	480
Blood glucose (mg/dl)	247	108

$^{\#}$Reference range $3.5\text{-}9.5\times10^{9}$ cells/L; *Reference range $4.3\text{-}10.8\times10^{9}$ cells/L; **Reference range $1.1\text{-}3.2\times10^{9}$ cells/L; ‡Reference range $1.3\text{-}3.4\times10^{9}$ cells/L. ALT=Alanine aminotransferase; AST=Aspartate aminotransferase; CRP=C-reactive protein; BUN=Blood urea nitrogen; LDH=Lactate dehydrogenase; N/A=Not applicable

DISCUSSION

In this report, we found that two patients co-infected with influenza virus Type B among 1639 pneumonia patients confirmed with COVID-19. In our report, the second patient had mild hemoptysis, which was not a common symptom of COVID-19 infection. In a similar study in China,[6] there were five confirmed cases of influenza B among 115 patients with COVID-19. One of these five patients was presented with hemoptysis. Therefore, it is important not to miss influenza, who are admitted with hemoptysis. This is useful for empiric therapy in these patients.

In another study in Northern California, the rate of co-infection between SARS-CoV-2 and influenza Type A virus was 0.9%. In that study, none of the COVID-19 patients was co-infected with influenza Type B virus.[7]

In another study from Southern Iran, four patients with co-infection of SARS-CoV-2 and influenza virus Type A were presented with co-infection rate of 33%.[9] This high co-infection rate might be due to the overlap between the emergence of SARS-CoV-2 and seasonal flu in that region.

CONCLUSION

During influenza season, differentiating other causes of respiratory illness from COVID-19 is difficult, becausecommon clinical manifestations of COVID-19 mimic those of influenza. It seems that evaluating for co-infection with different types of influenza viruses in patients with specific settings should be considered.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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