COVID-19 co-infection in a patient with brucellosis

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Abstract

An 89-year-old male case was hospitalized in the COVID-19 department. His computerized chest tomography scan showed nodular opacities with glass halo including peripheral distribution. The patient showed active brucellosis.Finally, his respiratory symptoms and the radiologic images had got better and the second SARS-COV-2 test and the serologic tests were negative

Introduction:

The epidemics and pandemics of human infectious diseases have always been around for thousands of years. In the meanwhile, viruses have caused significant problems that have remained hazardous outbreaks [1].The pandemic of Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) with a quickly universal spread [2, 3]. SARS-CoV-2 can involve multiple organs of the body such as respiratory, gastrointestinal, skeletomuscular, and neurologic systems [4]. Severe diseases arose only in 14% of patients especially in persons with comorbidities including higher age, hypertension, diabetes mellitus, and obesity, cardiac and chronic respiratory diseases [1, 5]. Nasopharyngeal swab and lower respiratory tract specimen can be used for COVID-19 diagnosis [5]. The co-infection of COID-19 with other endemic and local pathogens could detain the suitable medicine of the causative agent [4]. Brucellosis is an endemic zoonosis disease and an important public health issue in most developing countries such as Iran [3, 6]. Consumption of raw milk, unpasteurized dairy products, and inhalation of infected droplets can lead to brucellosis [7]. Typical symptoms of brucellosis including fever, malaise, and arthralgia can be similar to COVID-19 symptoms. The common laboratory findings of these infections are thrombocytopenia and leukopenia [3, 7]. In this article, a suspected COVID-19 case was hospitalized then who was finally diagnosed with co-infection with brucellosis and discussed.

Case presentation:

An 89-year-old male case attended the emergency department of Arak hospital, Arak, Iran with complaints of weakness, malaise, weight loss, and lethargy. After an initial assessment, physical examination revealed cough, shortness of breath, and oxygen saturation of 80% meanwhile he was breathing ambient air.

He had a history of fever, anorexia, worsening fatigue, muscle, and joint pain 3 months ago.

The patient was hospitalized in the COVID-19 department on account of his cough, dyspnea, and also his nasopharyngeal swab test of SARS-CoV-2 by qualitative real-time reverse-transcriptase- polymerase-chain-reaction (rRT-PCR) assay was positive. His computerized chest tomography (CT) scan showed nodular opacities with glass halo including peripheral distribution (Fig. 1).

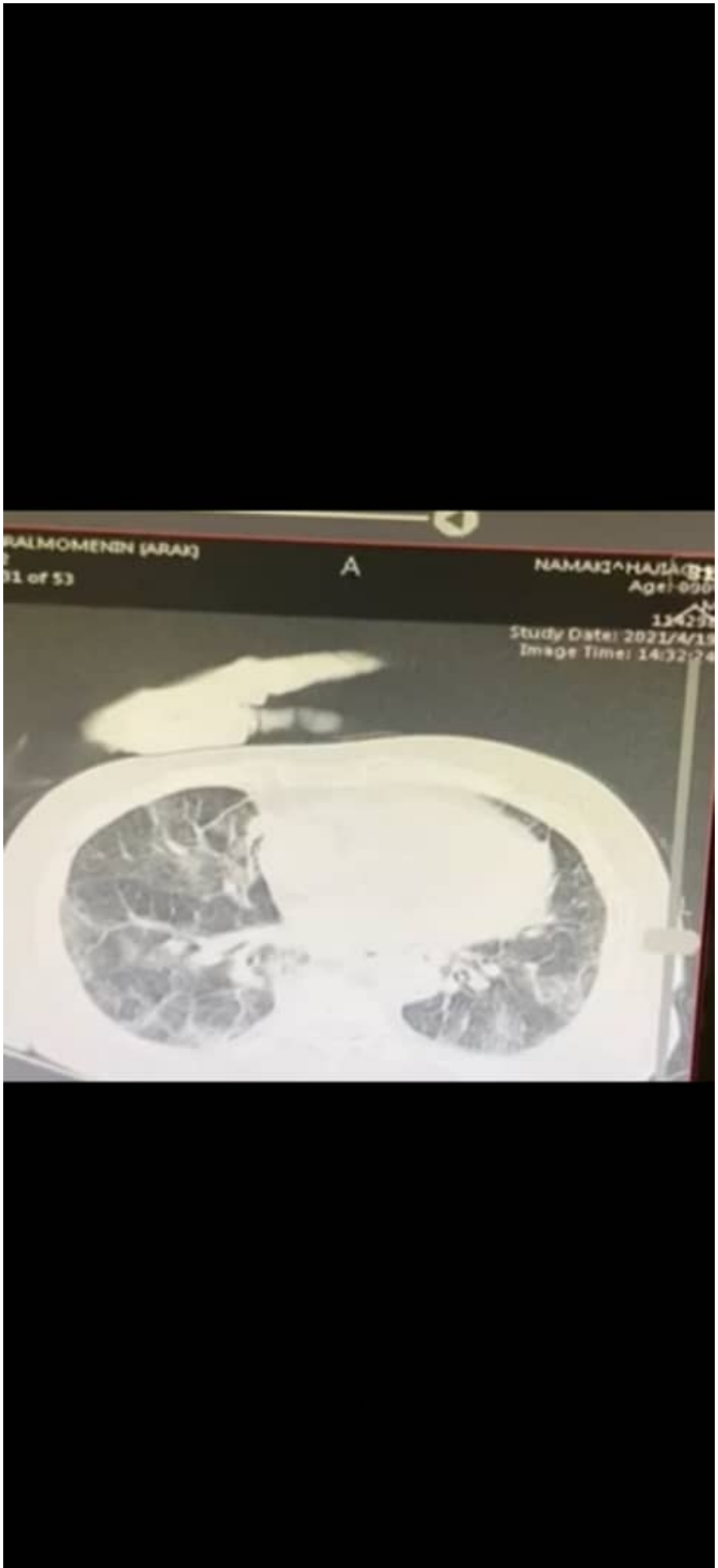

Fig. 1 Chest CT scan revealed multiple vessel-related nodular opacities with grand glass halo with central and peripheral distribution, bilateral pleural effusion.

His laboratory clinical results are shown in Table 1. Briefly, we found an increased white blood cell count ($17.22x10^3/\mu L$), a hemoglobin level of 13.8g/dl, a variable low P O2 (from 82 to 78 $/mm^3$), elevated transaminases, and a high D-dimer concentration (580 ng/L). On day 6^{th} he was admitted to the intensive care unit (ICU) requiring endotracheal intubation and mechanical ventilation for refractory hypoxia.

Table 1. Clinical laboratory results (hospitalization days)

Measure	**Reference range**	**Hospital Day 1**	**Hospital Day 2**	**Hospital Day 5**	**Hospital Day 6**	**Hospital Day 10**	**Hospital Day 11**	**Hospital Day 12**	**Hospital Day 13**	**Hospital Day 14**	**Hospital Day 15**	**H 1**
White-Blood cell count (per µl)	4000-10000	12600	11400	-	-	-	11210	13970	16860	17220	15580	1
Red-Blood cell count (per µl)	4,000,000-6,000,000	4,750,000	4680,000	-	-	-	5,700,000	5900000	5790000	5430000	5390000	5
Absolute Neutrophil count (per µl)	1900-8000	-	9404	-	-	-	9770	12830	16040	16080	14580	1
Absolute Lymphocyte count (per µl)	900-5200	2200	2000	-	-	-	740	550	530	610	540	7
Absolute Monocyte count (per µl)	0-800	250	360	-	-	-	680	580	290	-	450	7
Platelet count (per µl)	150,000–450,000	203000	263000	-	-	-	-	-	202000	-	-	-
Hemoglobin (g/dl)	12-17	13.8	13.5	-	-	-	-	-	-	-	-	-
Sodium (mmol/liter)	134-145	130	-	-	-	133	134	140	137	139	134	1

Measure	Reference range	Hospital Day 1	Hospital Day 2	Hospital Day 5	Hospital Day 6	Hospital Day 10	Hospital Day 11	Hospital Day 12	Hospital Day 13	Hospital Day 14	Hospital Day 15	H
Potassium (mmol/liter)	3.5-5.5	4.1	-	-	-	4.9	4.6	4.4	4.3	4.2	4.4	4
Urea (mg/dl)	17-45	55	-	-	-	55	58	45	55	58	45	5
Creatinine (mg/dl)	0.6-1.3	1.3	-	-	-	1.2	1.3	1.1	1.2	1.2	1.2	1
Alanine amino-trans-ferase (U/liter)	10-37	15	-	-	-	53	-	-	28	-	-	-
Aspartate amino-trans-ferase (U/liter)	10-37	27	-	-	-	55	-	-	35	-	-	-
Alkaline phos-phatase (ALP)(U/liter)	70-330	164	-	-	-	175	-	-	164	-	-	-
LDH (IU/L)	Adult<480	0	-	-	-	1359	-	-	738	-	-	-
C-reactive pro-tein (CRP)(mg/dl)	1-6	1	-	-	-	2	-	-	-	-	-	-
Ferritin(ng/ml)	16-220	-	-	-	-	904.2	-	-	-	-	-	-
D-dimer(ng/ml)	Negative<2	-	-	-	580	-	-	-	-	-	-	1
arterial blood gas (ABG); PH	7.35-7.45	-	-	7.28	7.36	-	-	-	-	-	-	-
arterial blood gas (ABG); Pco2(mmhg)	35-45	40	-	39.5	34.4	-	-	-	-	-	-	-
arterial blood gas (ABG); Po2(mmhg)	80-100	93	89	82	78	-	-	-	-	-	-	9

Measure	Reference range	Hospital Day 1	Hospital Day 2	Hospital Day 5	Hospital Day 6	Hospital Day 10	Hospital Day 11	Hospital Day 12	Hospital Day 13	Hospital Day 14	Hospital Day 15	Hospital D 1
arterial blood gas (ABG); Hco3(mmol/l)	22-26	-	-	-	19.7	-	-	-	-	-	-	-
Fasting blood sugar = FBS(mg/dl)	70-100	167	-	-	-	251	291	298	163	205	298	2
Troponin	-	-	-	negative	-	-	-	-	-	-	-	-
Prothrombin Time (PT) (sec)	11.5-14	13.9	-	-	-	14.7	14.7	14	-	14.5	15.5	1
International nor-malized ratio	0.9-1.2	1.15	-	-	-	1.1	1.1	1.0	-	1.1	1.3	1
Total Bilirubin (mg/dl)	Up to 1.2	2.1	-	-	-	-	-	-	0.89	-	-	-
Direct Bilirubin (mg/dl)	Up to 0.4	1.1	-	-	-	-	-	-	0.31	-	-	-
Indirect Bilirubin (mg/dl)	0.3-1	1	-	-	-	-	-	-	0.58	-	-	-
Erythrocyte sedimentation rate(mm)	0-15	48	-	-	-	-	-	-	-	-	-	-

In his family history, it was stated that two months later, he had lost his wife, and he presented with extreme fatigue and malaise. His children thought he was depressed.

Further history was gained, and it was found the patient had consumed raw milk from a dairy farm. On further questioning, the patient admitted to a history of brucellosis eight years ago. The patient also endorsed previously returned *brucella* symptoms that had happened over the previous months.

A follow-up serology (IgM/IgG) showed a positive *brucella* titer of 1:160 for wright [and Brucella coombs-wright 1:160, 2ME- wright (IgG) titer 1:40] and the patient was diagnosed with active brucellosis. He was

started on a combination of doxycycline 100 mg and rifampicin 600 mg once daily for six days in addition to anti-COVID-19 treatment (mini pulse of prednisolone, and dexamethasone 10 mg/ 12 h for 4 days, then 10 mg/ day for another 5 days. On the 16^{th} day of hospitalization, his P O2 was measured at 90% without ventilation, leukopenia improved completely, At the time of discharge, his respiratory symptoms had got better and the second SARS-COV-2 RNA test was negative. Since there is the first co-infection of brucellosis with COVID-19 in our region, this specific old patient in our case has been presented.

Discussion:

Brucellosis infects people of all age groups who consume raw dairy products or have close contact with infected animals [8, 6]. This zoonotic disease is an important socioeconomic problem and public health issue worldwide especially in developing countries [6].

The incidence of brucellosis is varied in different parts of Iran (average 114 per 100,000 populations) [7]. Our patient had main ailments including shortness of breath, fever and was hospitalized in the COVID-19 department. Because of the COVID-19 pandemic, and the risk of spreading the virus, taking a detailed history of his brucellosis and a positive serology test for Brucella was delayed. The patient had consumed unpasteurized milk and dairy products. The symptoms of fatigue, joint pains extreme weight loss, and drenching sweating are typical in brucellosis [5]. Thoracic CT imaging in our patient showed no symptoms of pulmonary brucellosis or other pulmonary disorders such as pneumonia and abscess of lungs empyema that are common in endemic countries such as Iran [1,6, 9]. Other clinical studies showed that in patients with mild to moderate COVID-19 a shared variety of clinical and laboratory features can be found in other diseases including Dengue and Malta fever [3, 6]. Other pathogens including influenza, legionnaire illness, dengue virus, and mycoplasma pneumonia are infections widely happening with SARS-CoV-2 infection [5, 10, 11, 12, 13]. The co-infection of brucellosis and SARS-CoV-2 is not generally reported [14]. It is the first report of Brucella and COVID-19 co-infection in our region. COVID-19 could mimic or unknown other febrile diseases therefore a positive test for SARS-CoV-2, is not an indication of the absence of other infections especially when the manifestation is uncharacteristic [5, 15].

In conclusion: brucellosis is an endemic disease in our country and, physicians should be overlooked other endemic diseases in COVID-19 patients based on the history of admitted patients.

Ethical approval

The patient has provided written informed consent for the publication of this case report.

Data availability statment

The clinical data used in this case report are presented in this article.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgments

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Authors' contributions

SH.SH and GH.S contributed in diagnosis and treatment the case. They contributed in discussing, implications, analysis of the data and preparing the manuscript. All authors read and approved the final manuscript.

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