

# A Confusing case, leptospirosis during COVID-19 pandemic: A case report

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## Introduction

since march 11, 2020 world health organization (WHO) reported a worldwide pandemic occurring by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (1, 2). COVID-19 infections symptoms includes a variation of fever, cough, dyspnea, headache, myalgia and abdominal pain (3). Since then, there were reports of coinfections or misdiagnoses of covid-19 with other infections which have the same clinical or paraclinical symptoms (4, 5). Leptospirosis is a common infection in Southeast Asia and is one of those infections which can have the same symptoms as COVID-19 including cough and myalgia (6). In this study we are reporting a case that was not surely a severe pulmonary leptospirosis or covid-19.

## Case-report

On August 22, 2022, a 27-year-old man presented to emergency room with severe abdominal pain, dyspnea, bloating and dyspepsia. The patient had a history of going to paddy two days ago, and two days before hospitalization he had experienced severe myalgia, headache and fever and had taken Diclofenac suppositories each 8 hours to control his fever. The day before hospitalization he had nausea and vomiting two times so he got serum injections.

On admission, the patient's body Temperature was 38.2°, with an oxygen saturation at ambient air of 97%, the Respiratory rate was 25 cycles/min, the pulse rate was 130 beats/minute and his Blood Pressure was 120/80. The patient was not dyspneic while talking. In clinical examination no unusual pulmonary sounds was heard, no rash, jaundice, conjunctival pallor and conjunctival suffusion were seen. He could answer questions consciously and was mentally normal.

Laboratory tests did not show any Leukocytosis at first (white blood cell: 10000 lymphocytes/mm<sup>3</sup>), but Thrombocytopenia was seen at 71000 thrombocytes/mm<sup>3</sup>, and a normal serum creatinine level of 0.8 mg/dl (normal value, 0.7-1.4 mg/dl). The patient's Blood Urea Nitrogen level was 20 mmol/L, and Aspartate aminotransferase and Alanine transferase were at 69 and 244 U/L. His C-reactive protein was at 290 mg/L, and Troponin 1 was negative but the B-type natriuretic peptide was high at 9641 pg/ml (Table 1).

On the second day of admission, SARS-CoV-2 reverse transcription-polymerase chain reaction (RT-PCR) test was done on nasopharyngeal sample and was negative but the D-dimer was high at 1585.7 ng/ml (normal value, 0-800 ng/ml). High-resolution computed tomography (HRCT) of the chest was performed on admission and no unusual pulmonary symptom was seen that could confirm the COVID-19 diagnosis. (Figure 1)

At this time, there was no evidence of COVID-19 so he got serum injections and pantoprazole (40 mg BD) for his abdominal pain. But 12 hours after admission, the patient's oxygen saturation at ambient air decreased to 79% and he developed dyspnea, requiring admission to the intensive care unit (ICU) to increase the oxygen

saturation. At this time, the patient’s general condition was not good enough for performing CT-Scan but in portable sonography a thickening of the gallbladder wall, low volume free liquid in pelvis interlope space and hepatitis was seen. After improvements in patient’s general condition a chest X-Ray was done and patch like lesions was seen from the apex to the base of both lungs. The administrated ICU treatment combined oxygen therapy with low-flow oxygen therapy with reservoir bag and corticosteroid therapy with dexamethasone (4mg stat and BID) and remdesivir (200mg stat and 100 mg daily) was given as the COVID-19 pandemic was happening at the moment. Another treatment that was given was ceftriaxone which was injected intravenously (1G, BID) because of the probability of leptospirosis which is a tropical infection that at the time was endemic in northern areas of Iran and also the patient mentioning attempting to paddy increasing the possibility of this infection. Leptospirosis could be the reason of his pulmonary symptoms that can happen when multi-organ failure happens by this infection so that hemorrhagic lesions in lungs at chest X-Ray can be the presence of this infection in lungs.

But after some hours, because of the slow increase in oxygen saturation at ambient air, because of the possibility of cytokine storm, Baricitinib (4 mg daily) was given orally.

On day 3 of admission, Procalcitonin was high at 4.14 ng/mL which shows sepsis or viral is likely that has affected kidney and a high N-terminal pro b-type Natriuretic peptide (NT- proBNP) at 9641 pg/ml can be because of the myocarditis caused by Covid-19 or leptospirosis infection, so Furosemide was injected intravenously (40 mg BD).

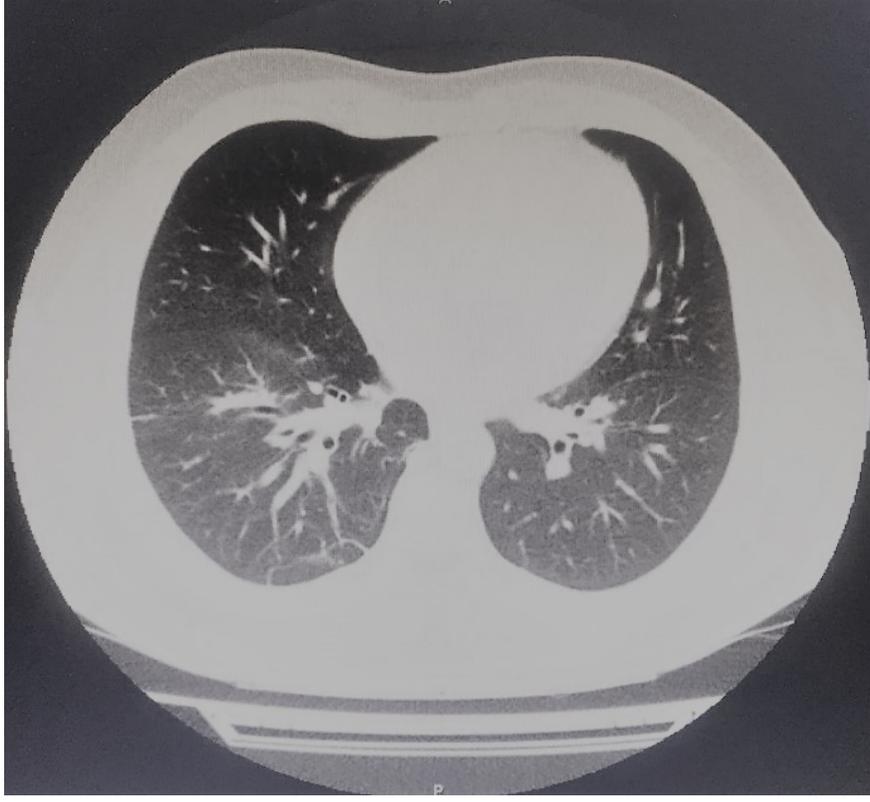
At this stage, Leptospirosis serology was performed on day 6 with ELISA (OneSite™ Leptospira IgM/IgG Combo Rapid Test) and reported the presence of anti-Leptospira IgMs at 5.8 NTU\*(Negative result<9 NTU) and IgGs at 4.6 NTU (Negative result<9 NTU).

After getting treatments mentioned above, the patient started to get better and was discharged after 10 days of hospitalization.

Results	Day1	Day 3	Day7	Day10
Leukocytes	10000	9500	30900	14000
Neutrophils/mm <sup>3</sup>	90%	94%	80%	82%
Lymphocytes/mm <sup>3</sup>	10%	6%	15%	16%
Platelets/mm <sup>3</sup>	71000	5000	113000	49000
C-reactive protein (mg/L)	290	208	290	245
Creatinine (µmol/L)	0.8	1.1	0.9	0.6
Blood urea nitrogen (mmol/L)	20	25	27.9	36
Aspartate aminotransferase (U/L)	244	204	109	215
Alanine aminotransferase (U/L)	69	78	48	138
Total Bilirubin (mmol/L)	—	—	2.94	—
NP SARS CoV-2 IgG and IgM (ELISA)	Negative	—	Negative	—
Serum Leptospira IgM and IgG (ELISA)	—	—	—	Negative

\*NTU: Nova Tech Units

Table 1: Laboratory tests



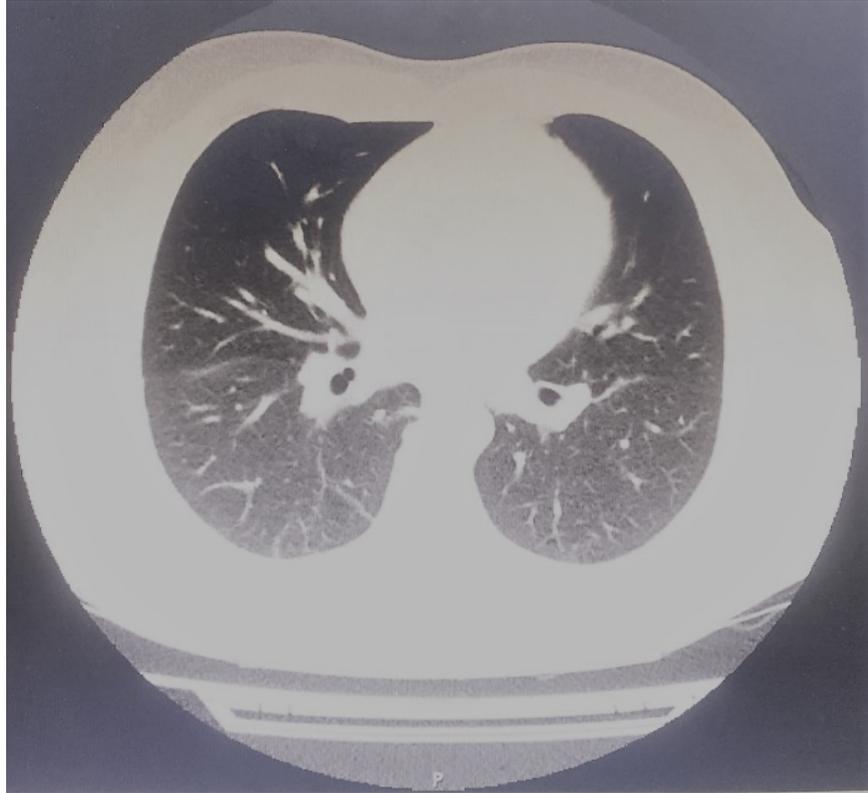


Figure 1: HRCT

## Discussion

Similarities in clinical presentation of pulmonary leptospirosis and covid-19 such as flu-like symptoms, acute respiratory distress, and CT-identified peripheral ground-glass opacities may cause misdiagnosis while the ongoing covid-19 pandemic going on all around the world (5). In order to confirm leptospirosis two tests' results are needed; IgM- positive ELISA serology and a positive PCR (7). About 17.5% of the participants in a report who were positive in MAT were negative in IgM-ELISA and calculated the specificity and sensitivity of IgM-ELISA as 78.8% (8). That can be the reason why the IgM and IgM ELISA were negative in this patient.

There are criteria for establishing the severity of leptospirosis including: severe respiratory failure, initial renal injury with hypokalemia and elevation of transaminases (5). In this case potassium was always in a normal range but during the hospitalization it raised from 3.5 to 4.3; but in a Urine Analysis that was done fourth day of hospitalization showed proteinuria and 7-8 Red Blood Cells; the transaminases AST and ALT were always high during this time. So, because of these evidences severe leptospirosis infection can be considered for this patient. COVID-19 can rise the amount of D-dimer, LDH, AST and ALT (9), just like what was seen in this case.

A rise in the amount Procalcitonin (PCT) levels can happen in COVID-19. In a study PCT level was over eight times higher in patients who had more crucial appearance than in moderate patients (10) just like that, in this case PCT level was almost eighty times higher than the upper limit of the normal range.

Both COVID-19 and leptospirosis can cause Cytokine storms during the infection (11).

Leptospira is reported to be highly susceptible to a lot of antibiotics. Although Penicillin is the first choice for this infection, there are other antibiotics such as doxycycline, cefotaxime and ceftriaxone that are useful

in treatment (12, 13). However, the treatments may be effective in early onset of the infection. Leptospirosis have some immune-mediated complications which can be controlled by adjuvant steroids (13).

## Conclusion

Although we didn't completely prove the type of microorganism in this patient, this case-report may help clinicians consider pulmonary leptospirosis along covid-19 infection, and recommends them to pay more attention not to misdiagnose these two infections with each other and also have both infections in their mind while approaching patients with the same symptoms. In endemic areas for leptospirosis clinicians should consider leptospirosis when they have negative SARS-CoV-2RT-PCR test; Because early antibiotic therapy would be helpful in the prognosis.

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## Conflict of interest

All authors have no relevant financial interests to be declared.

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## Consent

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

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