

Case Report

A Case of Interstitial Pneumonia under Immunosuppression, Complicated with Lower Respiratory Tract COVID-19 PCR Positivity

Introduction

COVID-19 infection is overwhelming the world after the World Health Organization (WHO) announced the pandemic. There is no effective way of protection or treatment so far. The only hope at this point is PCR testing to detect the virus RNA. It is known that the elderly and the patients with underlying diseases have more severe cases and have higher death rate than younger patients. We encountered a patient with worsening interstitial pneumonia possibly with pneumocystis carinii who turned out to be PCR positive for COVID-19. Dozens of heavy contact people including family and medical staff were all PCR negative. The patient was correctly interpreted as a compromised host who happened to have COVID-19 as a complication. Diagnosis of COVID-19 infection was difficult because the patient's main illness was interstitial pneumonia which revealed ground glass opacity in chest CT scan. The heavy contact people such as families and hospital staff suffered from enormous stress caused by reputational damage. Making a diagnosis of COVID-19 infection includes many social problems as well. Here we report a case of COVID-19 which was complicated with underlying disease and had multiple medical and social issues. Consent was obtained from patient's family.

Case Report

[Patient] 70 years old, male

[Past history] rheumatoid arthritis

[Smoking] 15 cigarettes/day, 46 years

[Present illness]

Patient visited our hospital with left shoulder pain in July 2018, and was diagnosed with rheumatoid arthritis. Chest CT scan revealed interstitial shadows on the bottoms of both lungs (Fig.1). Treatment with Salazopyrin (SASP) 500mg/day was started instead of standard treatment with Methotrexate, because he had interstitial pneumonia. Tacrolimus 0.5mg/day was added from January 2019, and Abatacept was added from November 2019. Patient exhibited sore throat, chest discomfort and headache for 4 days and visited our hospital in late February 2019. Chest X-ray revealed ground glass opacity on both lungs, and therefore he was admitted to our hospital for treatment (Fig. 2).

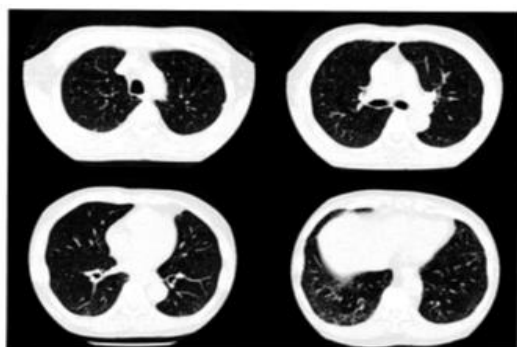


Fig. 1

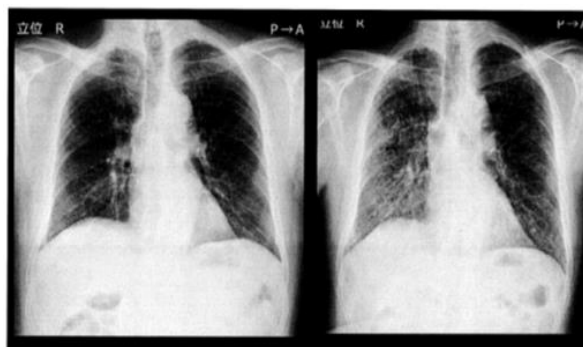


Fig. 2

[Physical findings]

Body temperature 37.8°C, blood pressure 121/76mmHg, pulse rate 108/min, respiratory rate 30/min, SpO₂ 66%(room air).

[Laboratory tests] Table 1

Test	Unit	Hospitalization 8 days ago	Day 1	Day 3	Day 4	Day 7
AST	IU/L	23	42	26	25	24
ALT	IU/L	19	23	13	13	14
LDH	IU/L	165	460	395	393	453
γ-GTP	IU/L	74		83	78	58
Urea nitrogen	mg/dL	13.5	37.4	15.4	12.8	34.7
Cr	mg/dL	0.83	1.35	0.88	0.91	0.98
Na	mEq/L	135	141	138	136	134
K	mEq/L	3.7	4.3	3.9	4	4.6
CRP	mg/dL	0.399	15.198	19.724	18.032	7.289
WBC	/μL	7,700	8,500	5,700	6,300	15,900
Hb	g/dL	13.4	15.3	13.4	13.5	11.9
PLT	10 ⁴ /μL	19.9	21.5	20.3	22.2	18.3
Baso	%		0.1	0.2	0.2	0.1
Eosino	%		0	0.4	1.1	0
Neutro	%		87.4	82.4	86.3	93.3
Lympho	%		6	11.2	7.7	4.1
Mono	%		6.5	5.8	4.7	2.5

[Chest CT scan]

ground glass opacity was displayed diffusely on both lungs (Fig.3).

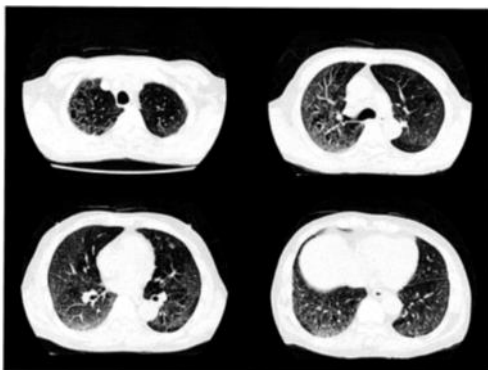


Fig. 3

[Course after admission:]

Patient didn't feel any fever, and exhibited neither cough nor sputum. Oxygen saturation was remarkably reduced, but patient had no dyspnea. Pneumocystis carinii pneumonia was suspected, because patient was not prescribed Trimethoprim-Sulfamethoxazole (SMX-TMP) in spite of treatment with immunosuppressants, and typical CT scan findings (Fig.3). Another possible diagnosis was worsening of interstitial pneumonia. Treatment with SMX-TMP was started along with Ceftriaxone 2g/day for suspected secondary bacterial infection. On day 3, non-invasive positive pressure ventilation (NPPV) was started because oxygen saturation was not improved with

regular oxygen mask. On day 4, patient had discomfort with NPPV mask, and nasal high flow therapy (NHF) was started. On day 5, laboratory test revealed that KL-6 1,501U/mL, SP-D 495.0ng/mL, and β -D glucan 7.2pg/mL, which pointed to patient having worsening interstitial pneumonia rather than pneumocystis carinii pneumonia. Methylprednisolone 500mg/day was prescribed for 3 days. On day 6, oxygen saturation was below 85% even with NHF, so that patient was intubated for ventilator management. Synchronized intermittent mandatory ventilation was started.

Patient had fever several times a day until day 6, but was afebrile after Methylprednisolone was administered. Patient had neither cough nor sputum during admission, and the amount of respiratory tract secretion was very small. COVID-19 infection was less likely because he had never traveled overseas and never contacted with COVID-19 patients, and because there weren't any patients of COVID-19 in the city where he lived. However, it was a severe case of interstitial pneumonia which was beyond the capability of our hospital with no pulmonologist. We consulted Public Health Department for availability of COVID-19 PCR test, but it was gently declined because the patient's clinical condition was interstitial pneumonia rather than viral pneumonia, and because there weren't any signs of in-hospital infection.

On day 8, PCR testing by a private testing laboratory was approved by the Japanese government. On that day, COVID-19 PCR by said private testing laboratory was performed using the sample aspirated from patient's intrathoracic tube, which turned out PCR positive. Patient was transferred to another hospital for advanced treatment, and was retested for COVID-19 PCR. The result was positive for sputum, and negative for nasopharynx. Approximately 50 heavy contact people including family, nurses, doctors, and the other hospital personnel were tested for COVID-19 PCR, and were all PCR negative.

Discussion

Diagnosis for COVID-19 was very difficult in this case, because pneumocystis carinii pneumonia or worsening interstitial pneumonia was strongly suspected due to the above mentioned chest CT findings.

COVID-19 infection is threatening the whole world, for which there is apparently neither clear diagnostic criteria nor effective treatment. Huang et al. reported that common symptoms at onset of illness were fever (98%), cough (76%), and myalgia or fatigue (44%), and dyspnea developed in 55% of patients.¹⁾ Guan *et al.* analyzed data from 1,099 patients to report that the most common symptoms were fever (87.9%) and cough (67.7%), and that the typical radiological finding on chest CT was ground-glass opacity (50.0%).²⁾ However, some patients did not exhibit either fever or abnormal findings on chest CT. In Japan, more case reports are published daily, but each case has different clinical condition and there are no uniform symptoms or radiological findings. If a patient has underlying disease such as interstitial pneumonia or pneumocystis carinii pneumonia, diagnosis of COVID-19 infection is difficult because the chest CT displays diffuse and prominent ground-glass opacity.

It has been also reported that senior patients and patients with underlying diseases such as diabetes, hypertension, or heart disease are at high risk of infection.^{1,3)} In addition, patients taking immunosuppressant should also be regarded as high risk, because they are prone to accept COVID-19 as compromised hosts. Present case was considered to be an inapparent infection of COVID-19 occurring in a compromised host, because the infection route was not detectable and heavy contact people were not infected, and the sample from nasopharynx displayed negative for PCR. It was therefore meaningful to test for COVID-19 at this point, in the event patient may have caused in-hospital infection. However, it is doubtful whether it was beneficial for this patient to be tested for COVID-19 which has no treatment but may cause negative social implications to his family and medical staff. For this patient, COVID-19 just incidentally "happened to be there", but it was not his primary medical issue. Clinicians should therefore clearly understand and distinguish that "infection" and "disease" are not always the same.

After WHO announced the pandemic COVID-19, it is apparently spreading widely in Japan. People are terrified

and are exhibiting difficulty in economic and social life. The public is fearful of negative social implications, and are therefore not able to live normal lives. Before performing PCR, it is therefore necessary and recommended to consider and discuss how to deal with psychological damages and compensation for economic loss of patients. We hope that meaningful insights and truths from such case reports can lead to constructive solutions around the issues of COVID-19 infection.

References

- 1) Huang C, Wang Y, Li X, *et al.* Clinical features of patients with 2019 novel coronavirus in Wuhan, China. *Lancet.* 2020; 395: 497-506.
- 2) Guan W, Ni Z, Hu Y, *et al.* Clinical characteristics of Coronavirus disease 2019 in China. *N Engl J Med.* 2020. [Internet] Available from <https://doi.org/10.1101/2020.02.06.20020974>
- 3) Wang W, Tang J, Wei F. Updated understanding of the outbreak of 2019 novel coronavirus (2019-nCov) in Wuhan, China. *J Med Virol.* 2020. [Internet] Available from <https://doi.org/10.1002/jmv.25689>