

Case Report

A case of COVID-19 pneumonia complicated with rhinitis / sinusitis who was required 41 days from onset to negative SARS-CoV-2 PCR test

Yoshitaka Yamazaki ¹⁾, Mitsuru Kosaka ¹⁾, Takashi Maruno ¹⁾, Shouri Shimizu ²⁾, Koji Sakaguchi ³⁾

1) Division of Infectious Diseases Center, Nagano Prefectural Shinshu Medical Center

2) Division of Ear and Rhinology, Nagano Prefectural Shinshu Medical Center

3) Division of Respiratory Surgery, Nagano Prefectural Shinshu Medical Center

Introduction

New coronavirus infection (COVID-19) is a respiratory infection caused by new coronavirus (SARS-CoV-2), which was first reported in Wuhan, China in December 2019. Approximately 80% of patients are reported to have spontaneous or mild fever and upper respiratory tract inflammation. On the other hand, both infected persons and asymptomatic pathogen carriers are subject to recommended hospitalisation according to type 2 infection, and before permitting discharged, the PCR test for SARS-CoV-2 with nasopharyngeal swab needs to be negative twice in a row. We experienced a case in which it took a long period of 41 days from the onset of COVID-19 until PCR was negative twice in a row. CT scan of the nose for examination of the nasal congestion revealed findings of sinusitis (ethmoid sinusitis, maxillary sinusitis) and hypertrophic rhinitis. Here it is reported that this may have been involved as a site for secondary infection or colonisation.

Case Report

Case in the 20s

[Main complaint] fever

[Medical history] Nothing to note

[Living history] No smoking, alcohol Drinking opportunity

[Allergy history] None

[Present illness]

From February 8, 2020, fever in the 37°C range and cough appeared. As a symptomatic person, 2/11 SARS-CoV-2 PCR was performed with a pharyngeal swab, and the patient became positive, so she was admitted to our hospital on 2/12. She was positive and was hospitalised on the same day.

[Physical findings on admission]

Height 170cm, weight 95kg, BMI 32.9kg/m², body temperature 37.5°C, respiratory rate 16 times/min, SpO₂ 96% (indoor air), blood pressure 140/87mmHg, pulse rate 87 times/min, respiratory rate 16 times/min. Consciousness clear. No cervical lymphadenopathy. Heart sounds are smooth and no heart murmurs. The lung sounds are clear. Laboratory findings on admission: WBC 7,900/μL, CRP 1.23mg/dL and elevation of inflammatory response were mild, and there were no abnormal findings in liver and renal function.

[Chest X-ray (Fig. 1)] No abnormality

[Post-hospitalization (Fig.2)]

A fever of 38 °C was observed on 2/14, but the patient had a fever on the following day, and cough and sputum gradually disappeared. 2/17 The PCR of the pharyngeal swab was positive. The National Institute of Infectious Diseases SARS-CoV-2 infection sample was collected by updating the sample collection /transportation manual for patients suspected of infection as of February 21. When the specimen was taken from the nasal cavity, stricture

was found in the left nasal cavity, so the procedure was performed from the right nose. Chest CT showed ground-glass opacities (Fig. 3) in the lower lobe of both sides, but the subjective symptoms were alleviated.



Fig.1. Chest X-ray on 2/13 was normal.

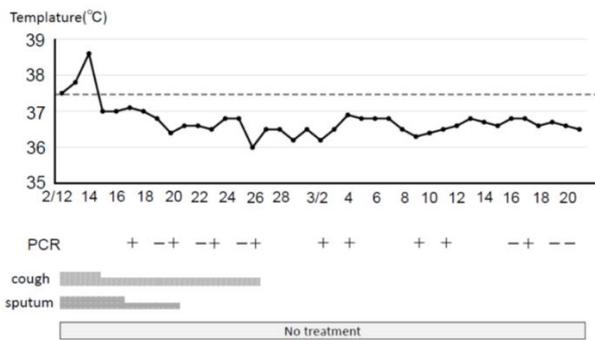


Fig. 2. Clinical progress chart. PCR results are shown as positive: (+) and negative: (-).

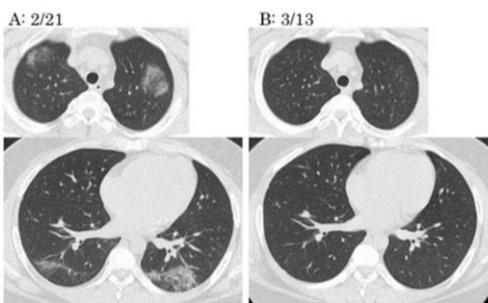


Fig. 3.

A: Chest CT on 2/21 shows ground-glass shading on upper and lower lobes bilaterally.

B: Ground glass shadow disappeared on chest CT on 3/13.

Although PCR was repeated with the nasopharyngeal swab, no negative results were obtained twice in a row. On 13/13 chest CT, the ground-glass opacities in both lung fields almost disappeared. Chronic sinus CT (Fig.4) showed thickening of the left nasal mucosa and narrowing of the nasal cavity, and a soft shadow on the ethmoid sinus and maxillary sinusitis, suggesting chronic rhinitis and sinusitis. The findings of sinus CT on 3/13. a: Left hypertrophic rhinitis. b: localized thickened mucosa in the lumen of the maxillary sinus, c: left ethmoid sinusitis, d: right sphenoid sinusitis.

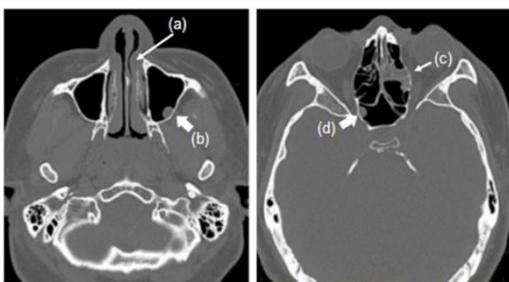


Fig. 4.

Discussion

Examination of nasopharyngeal swabs in patients with COVID-19 reported that the viral load peaked several days after the onset of the disease ¹⁾. In addition, a study of serial intervals on infected persons and pairs of infected persons reported that a significant portion of secondary infections may occur before the onset of the disease ²⁾. On the other hand, at least some of the recovered patients may still be virus carriers, and it is unknown how small virus detections are associated with infectivity. Zou et al. reported that the median viral shedding period was as long as 20 days in survivors, and the longest observed viral shedding period in survivors was 37 days ³⁾.

In this case, an adolescent with BMI of 32.9kg/m² and obesity, but with no clear underlying disease present, PCR positive was finally confirmed on the 38th day after the onset of fever and respiratory symptoms, and PCR was confirmed twice consecutively on the 41st day, and the patient was discharged from the hospital. While swab passage was impaired when nasopharyngeal swab was collected from the left nasal cavity during hospitalization, sinus CT scans showed hypertrophic rhinitis and ethmoid sinus. He had a finding of sinusitis of the maxillary sinus, and that was considered to be one of the factors that prolonged viral excretion.

It is considered that SARS-CoV-2 infects or colonises over a wide range, from upper respiratory tract to lower respiratory tract and alveoli. Wang *et al.* ⁴⁾ examined the positive rate by PCR for each clinical specimen, and reported bronchoalveolar lavage fluid in 93%, sputum in 72%, pharyngeal swab in 32%, and nasopharyngeal swab fluid in 63% of cases, respectively. SARS-CoV-2 is thought to have many viruses in the nasopharynx and lower respiratory tract. In this case, the presence of hypertrophic rhinitis may restrict the air flow and the chronic inflammation may cause the virus to settle, but the detection may be delayed. In addition, sinusitis was found in the bilateral ethmoid sinuses and bilateral maxillary sinuses. In this case, it is not possible to determine whether sinusitis is acute or chronic. Neither the ethmoid sinus nor the maxillary sinus is directly involved in the respiratory airflow, but whether SARS-CoV-2 may enter the paranasal sinuses to establish and settle inflammation will await further investigation.

As mentioned above, the number of hospitalized patients, including not only severely ill patients but also mildly ill patients, is increasing in COVID-19 patients, and the function of the hospital is declining. In addition, it is necessary to expand facilities other than hospitals to accommodate patients with very low virus shedding, and to introduce more effective antiviral treatment at an early stage to actively shorten the virus shedding period.

References

- 1) Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, *et al.* SARS-CoV-2 Viral Load in Upper Respiratory Specimens of Infected Patients. *N Engl J Med.* 2020; 382: 1177-1179.
- 2) Nishiura H, Linton NM, Akhmetzhanov AR. Serial interval of novel coronavirus (COVID-19) infections. *Int J Infect Dis.* 2020 Mar 4; 93:2 84-286. doi:10.1016/j.ijid.2020.02.060.
- 3) Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, *et al.* Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet.* 2020; 395: 1054-1062.
- 4) Wang W, Xu Y, Gao R, Lu R, Han K, Wu G, *et al.* Detection of SARS-CoV-2 in Different Types of Clinical Specimens. *JAMA.* March 11, 2020. doi:10.1001/jama.2020.3786.