Recurrent Coronavirus Diseases 19 (COVID-19): A Different Presentation from the First Episode

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Abstract

A 31-year-old male Caucasian patient developed reinfection with SARS-CoV-2, 2 $\frac{1}{2}$ months after an initial episode of ICU admission for respiratory support due to COVID-19. The second episode was in the form of malaise, aphthous gingival ulcer, and desquamating palmar lesion.

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ABSTRACT

Introduction : The reinfection with the severe acute respiratory syndrome novel coronavirus 2 (SARS-CoV-2) has been sporadically reported. However, no case report has presented a different manifestation in the second episode from the initial one.

Case report : Patient is a 31-year-old male Caucasian male who recovered from infection with SARS-CoV-2 following admission to the intensive care unit for respiratory support due to coronavirus disease 19 (COVID-19). Seventy nine days later, he developed malaise, aphthous gingival ulcer, and desquamating palmar lesion, which was confirmed by a nasal swab PCR, to be a reinfection with SARS-CoV-2. He recovered from the reinfection with no inpatient medical care.

Conclusion : Despite controversy on the protective immunity by the neutralizing antibody against SARS-CoV-2, reports of recurrent COVID-19 are increasingly published with variable time intervals. This case report encourages the clinicians to stay alerted about the potential risk of reinfection with SARS-CoV-2 while the vaccination efforts are soaring globally.

Keywords: Coronavirus Diseases 19; COVID-19; Pandemic; Recurrence;

Key Clinical Message

A 31-year-old male Caucasian patient developed reinfection with SARS-CoV-2, 2 $\frac{1}{2}$ months after an initial episode of ICU admission for respiratory support due to COVID-19. The second episode was in the form of malaise, aphthous gingival ulcer, and desquamating palmar lesion.

Introduction

The pandemic of coronavirus diseases 19 (COVID-19), caused by the severe acute respiratory syndrome novel virus (SARS-CoV-2), continues despite initiation of the global vaccination[1]. Besides its exhausting length and overwhelming burden, the number of reports of patients with SARS-CoV-2 reinfection is increasing[2-4]. A systematic review of the literature estimated the incidence rate of the recurrent SARS-CoV-2 positivity to be 14.8%[5].

The majority of the case reports on this topic have described a more severe clinical presentation for the reinfection compared to the initial encounter. However, to the best of our knowledge, there is no report to present a case of reinfection with a different clinical manifestation from the initial episode.

Case Presentation

Patient is a 31-year-old Caucasian resident physician with a laboratory-confirmed diagnosis of COVID-19 in July 25th 2020. The patient initially presented with a 3-day history of fever (oral temperature of 99.8 degF), malaise, cough, shortness of breath, anosmia, and a dropped O2 saturation to 88% on room air. A computerized tomography (CT) of the chest showed bilateral ground glass opacity of the lungs (Figure 1). He was admitted to the intensive care unit (ICU) and received supportive treatment with supplemental oxygen 3-4 liter/minute, hydroxy chloroquine tablet 200 mg twice a day, and 6 mg intravenous dexamethasone daily. He recovered uneventfully in one week with an O2 saturation of 94%, and resumed his duty without any restrictions. Although complaining of chronic fatigue for a few weeks, a follow-up nasal swab polymerase chain reaction (PCR) testing for SARS-CoV-2 got negative two weeks after the discharge from the hospital.

In October 12th, 2020 (79 days after the initial encounter), the patient developed malaise followed by painful submandibular lymphadenopathy and gingival aphtous ulcers (Figure 2). Two days later, he developed fever (oral temperature: 99.8 degF) and myalgia. A PCR test of the nasopharyngeal swab was positive for COVID-19 and the patient quarantined himself taking naproxen tablet 250 mg every 12 hours for 4 days. As he did not have any shortness of breath, he did not seek a medical care and hence no chest imaging was obtained. Although his symptoms improved over the next 3 days, he developed skin desquamation of the palms and fingers (Figure 3). The skin changes improved swiftly over the course of a week as did his other symptoms. The patient did not require any other medication.

Discussion

While our knowledge regarding the risk factors for reinfection and other associated parameters are evolving, data points out the temporary protectivity of anti SARS-CoV-2 antibodies[6] and the emergence of viral escape mutants as potential mechanisms for recurrent cases[7]. Our case developed a reinfection with SARS-CoV-2

after an initial episode of symptomatic disease and a 2-month disease-free interval. The second episode was significantly milder requiring no inpatient medical care but relatively different in presentation from the initial episode. In a surveillance study at the Oxford University Hospitals in the United Kingdom, Lumley et al. measured anti-spike and anti-nucleocapsid IgG antibodies in 12,541 healthcare workers and followed them for a period of 31 weeks[6]. The authors found that out of 1,265 seropositive cases, 88 had developed seroconversion during the follow-up period. On the other hand, 223 seronegative subjects developed a positive PCR test (1.09 per 10,000 days at risk) of whom 44.84% were asymptomatic and 51.6% were symptomatic. This was significantly different from the only 2 seropositive cases who became PCR-positive during the follow-up period (0.13 per 10,000 days at risk). While in average the anti SARS-CoV-2 antibodies rendered an immunity against reinfection for a duration of 6-month, our case report along with others raise questions about the generalizability of such a short-term protection[4,5]. However, none of these case reports have monitored the evolution of neutralizing antibodies against SARS-CoV-2 from the initial infection to the time of reinfection.

A genomic analysis of SARS-CoV-2 obtained at two different times from a 25-year-old man from Washoe, Nevada revealed genetically significant differences between the two species[4]. Unlike our patient's, the second episode was more severe in terms of clinical symptomatology. Further case reports have also shown a declining antibody titer to coincide with the reinfection of SARS-CoV-2[2,3,8]. The case report from Hong Kong showed that an initially mild infection with SARS-CoV-2 did not produce any effective neutralizing antibody, which 5 months later resulted in reinfection with the virus although completely asymptomatic [2]. Another case report from Netherlands showed a more severe presentation of SARS-CoV-2 reinfection compared to the index episode[3]. Although the latter patient was immunocompromised due to recent B-cell depleting chemotherapy for Waldenstrom's macroglobulinemia, an effective innate immune or T-cell response might have acted as a savior. The same path can be imagined for the case report from Hong Kong in whom no effective neutralizing antibody was detected in either of the episodes. Unfortunately, our current laboratory setting did not permit measuring anti SARS-CoV-2 serum antibody titers from the index infection to the recurrence of COVID-19 nor did it allow the genomic analysis of the causative agents in these two different episodes.

The time interval between the initial infection with SARS-CoV-2 and the second episode has been variably reported in the literature[3-5,8]. While the duration of protectivity rendered by anti-spike or anti-nucleocapsid IgG antibodies has been shown to be a minimum of 6 months, a systematic review of the reported cases of reinfection with SARS-CoV-2 has estimated this interval to be 35.4 days[5]. The review has also found that younger age and a longer time to become PCR-negative is significantly associated with a higher risk of reinfection with SARS-CoV-2 while a severe disease might play a protective role.

Our case report supports the growing doubt about a lasting herd immunity against SARS-CoV-2. Although our patient presented differently in the second episode from the initial one, the clinical manifestation was less severe clinically. The time from initial infection to the recurrent episode was above the average reported in the literature. However, we could not examine the evolution of neutralizing antibody over this interval as the titer was not measured in our case. While the current endeavors in global vaccination against SARS-CoV-2 is ongoing, clinicians should stay alert about variation in individuals' response to the infection and the potential risk of reinfection despite receiving the vaccine. This is especially important when we are reading the news about the emerging variants of the virus, which seem to be more contagious[9].

Authors' contribution

Saeed Shoar performed a literature review, developed the study structure, drafted the manuscript, and approved its final version for the intellectual content.

Siamak Khavandi developed the study idea, performed a literature review, participated in drafting the manuscript, and approved its final version for the intellectual content.

Elsa Tabibzadeh participated in developing the study conception, collecting the patient data, and drafting the manuscript, and approved its final version for the intellectual content.

Soheila Khavandi participated in developing the study conception, collecting the patient data, and drafting the manuscript, and approved its final version for the intellectual content.

Declaration of competing interest

Authors have no conflict of interest to declare in any forms.

Data accessibility statement

This study does not have any data repository or outsource to be accessed.

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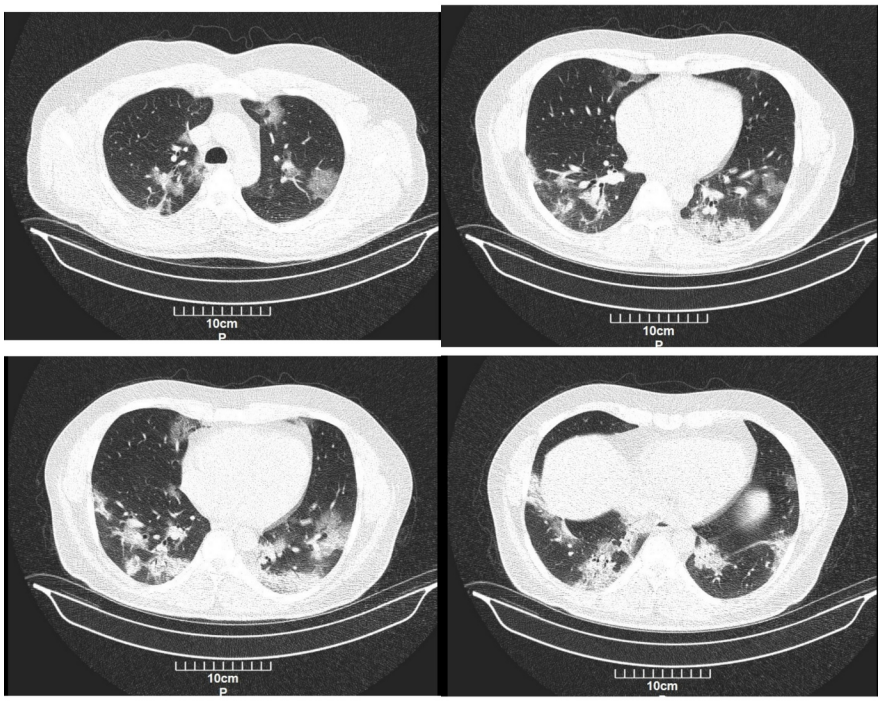

Figure 1 . Chest CT scan showing diffuse bilateral ground-glass opacities with preference in the lower lungs with foci of alveolar turbidity, suggestive for COVID-19.

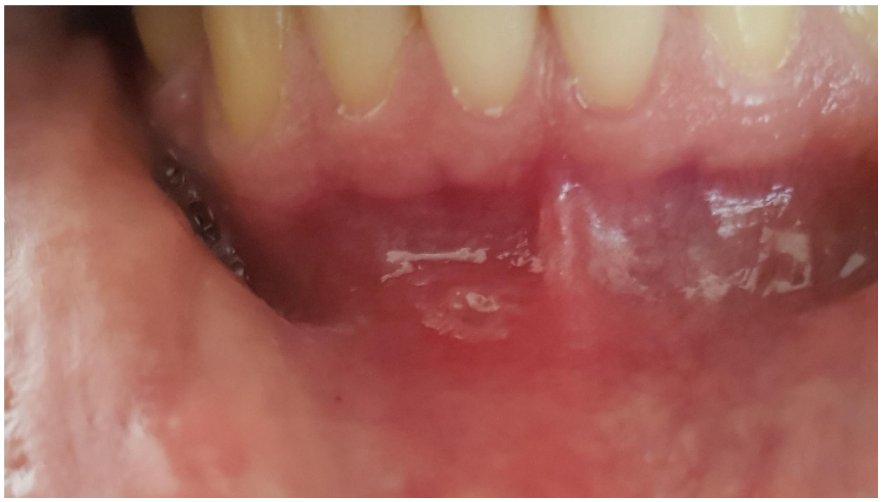

Figure 2 . Ulcerative aphthous in lower gingiva during the second episode of COVID-19

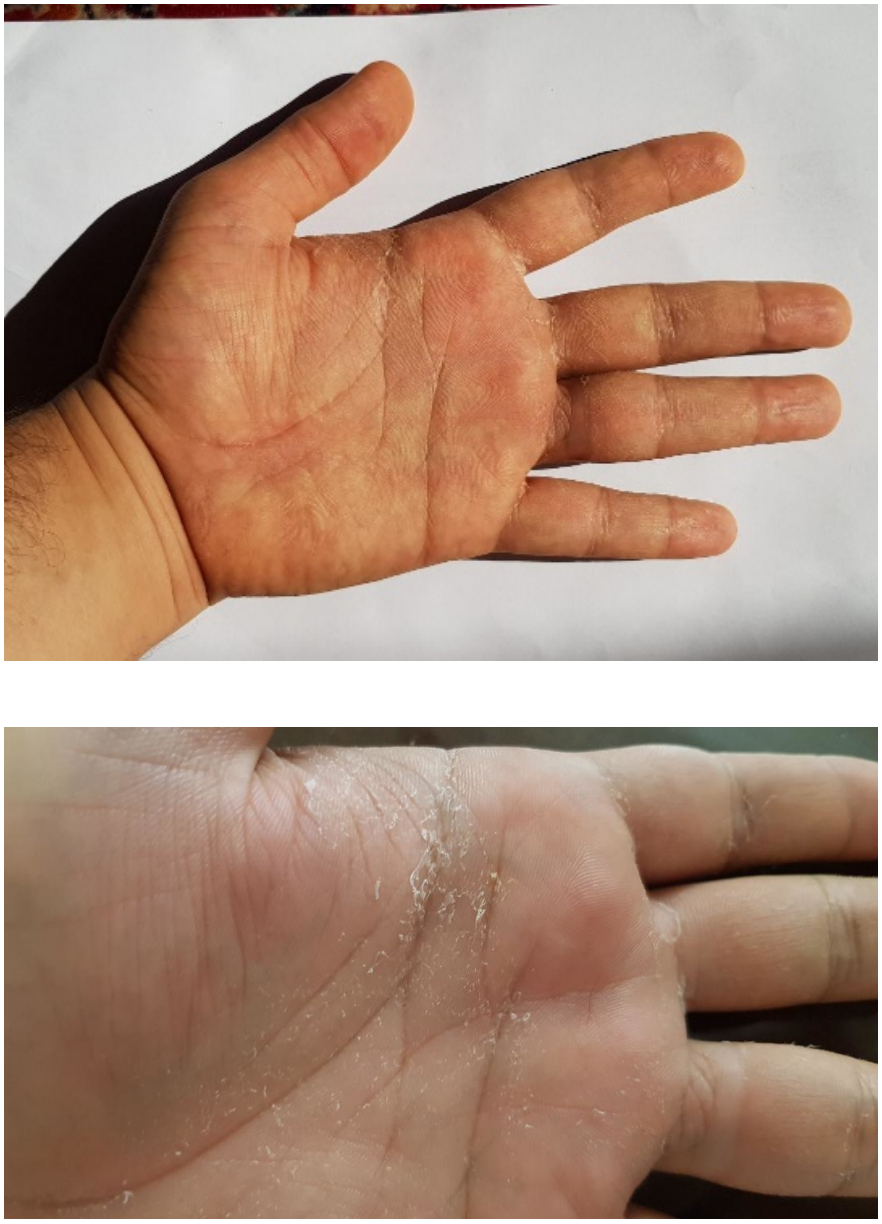

Figure 3 . Skin desquamation of the palms and fingers during the recovery period in a patient with COVID-19 recurrence