

How Early, Reinfection of COVID-19 can Occurred- A Case Report

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ABSTRACT

The efficacy and duration of protective immunity made by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is unknown. In studies of immunity to other corona viruses, loss of immunity can occur within 1–3 years. But how long this SARS-CoV-2 gives immunity to reinfection is not well understood. In this case report, we describe a 40-year-old male patient presented with two different episodes of SARS-CoV-2 infection (COVID-19 illnesses) within two months period.

Key words: severe acute respiratory syndrome coronavirus 2, SARS-CoV-2, reinfection, immunity.

Introduction

Coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), now has become a global severe public health problem.¹ Since the beginning of the pandemic, it spread across the world, and many unanswered questions about COVID-19 remain.

Infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) leads to an immune response and formation of neutralizing antibody, but immunity of previously infected individuals to reinfection with SARS-CoV-2 is not well understood. Usually antibodies have been detected a few days after the onsets of infection.^{1,2} However, if previous infection gave immunity to subsequent infection with SARS-CoV-2 then how long period it will protect us is questionable. It is unknown whether all infected patients produced adequate protective immunity or how long this effect remains.^{1,2} We present a case report of SARS-CoV-2 infection who had two different episode of COVID-19 illnesses within 2 months of period.

Case Report:

A 40-year-old known hypertensive, diabetic, obese male presented with low grade fever, body aches for 3 days followed by irritating dry cough. He gave history of contact with COVID patients among his family members. On clinical examination, his blood pressure was 130/80 mmHg, and his pulse was 96 beats/minute and regular. The rest of his examination findings were unremarkable. On Laboratory investigation, CBC, SGPT, S. Creatinine, D-dimer, S. Ferritin, Procalcitonin, Chest X-ray all were normal. Only CRP was raised (table-I). High-Resolution Computed Tomography (HRCT Scan) of the chest revealed normal findings. Nasopharyngeal and oropharyngeal swab test for COVID-19 was positive on quantitative reverse-transcriptase-polymerase-chain reaction (qRT-PCR) assay on 15 September, 2020. He was categorized as a Mild case of COVID-19 infection and improved within 10 days with conservative treatment (Azithromycin, Ivermectin, Fexofenadine, Paracetamol).

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On 25th September 2020 he was retested for COVID-19 by RT-PCR from nasopharyngeal and oropharyngeal swab and test report came negative. After 15 days of isolation, he again join to his professional life.

Unfortunately on 20th November 2020, he again developed high grade fever, severe body ache and severe irritating dry cough with occasional chest tightness at night. He attended a family program 3 days back. This time he again positive for COVID-19 on RT-PCR from nasopharyngeal and oropharyngeal swab sample on 25th November 2020. HRCT Scan of chest showed featured of early stage pulmonary inflammation along with multifocal ground glass opacities with random distribution in periphery of right lung. Laboratory investigations findings are compared in Table-I. This time he was categorized as a case of COVID-19 associated pneumonia. He was treated with C-amoxiclav, Ivermectin, Fexofenadine, Montelukast, Paracetamol, Rivaroxaban and Favipiravir. He was quarantined for 3 weeks and repeated RT-PCR for SARS-CoV-2 was negative. On follow up visit after one month, he was in good health with occasional generalized weakness.

Table-I: Comparison of investigations findings during two episodes of COVID-19.

Investigations	15 th September 2020	25 th November 2020
HB%	15 g/dl	16 g/dl
ESR	15mm	12mm
Total WBC count	5,320/Cmm	6150/Cmm
Lymphocytes (differential)	29%	24%
Neutrophil (differential)	65%	72%
Platelet count	1,93,000/Cmm	1,89,000/Cmm
S. Creatinine	1.00 mg/L	0.96 mg/dl
SGPT	30 U/L	17 U/L
CRP	15.9 mg/L	8.1 mg/L
D-dimer	0.10 mg/L	0.08 mg/L
S. Ferritin	111.70 ng/ml	114.6 ng/ml
Procalcitonin	<0.01 ng/ml	0.05 ng/ml
S. LDH	108 U/L	122 U/L
Chest X-ray P/A view	Normal	Normal
HRCT Chest	Normal	Ground glass opacity in right lung.

Note: HB- Hemoglobin, ESR- erythrocyte sedimentation rate, WBC- white blood cells, SGPT- Serum glutamic pyruvic transaminase, CRP- C Reactive protein, LDH- lactate dehydrogenase, HRCT- High-Resolution Computed Tomography.

Discussion:

The COVID-19 pandemic in Bangladesh is part of the worldwide pandemic of coronavirus disease 2019 (COVID-19). Since its first detection in Bangladesh on March 2020, the pandemic has spread day by day over the whole nation with increasing numbers of affected people. Between 8 March 2020 and 24 January 2021, according to the DGHS, Bangladesh, Press Release <<https://corona.gov.bd/press-release>> there were five hundred thirty-one thousand seven hundred ninety-nine(531,799) COVID-19 confirmed by rRT-PCR, Gene Xpert and Rapid Antigen tests including eight thousand twenty-three(8,023) related deaths (CFR1.51%). Bangladesh is the top 30th country in the world and accounts for 0.55% of the COVID-19 disease burden of the world.³

Reinfection with COVID-19 is rare, with only a few of cases reported among the 42 million cases worldwide. The susceptibility of previouslyinfected patients to reinfection is not clear. COVID-19 reinfection have been reported in Hong Kong, Netherlands, Belgium, Ecuador, Israel, Bangladesh and Australia.^{4,5}We have innate and adaptive immunity. When any viral infection occurs, IgM antibodies typically appear within one to two weeks. These antibodies act against the virus and then it begin to disappearwithin 2 to 3 months. A few weeks after an infection has cleared, IgG antibodies appear. Typically, IgG levels persist for many years and give immunity to that virus.⁴

Most of the SARS-CoV-2 infected patients developed detectable antibodies after 10–14 days of symptom appears, though antibody levels in patients with mild disease may be very low or undetectable.⁶Studies have shown that, long-term immunity to coronaviruses is not that effective. Previous studies of MERS and SARS-CoV infections have shown that total binding and neutralizing antibodies to these

infections decrease over 1 to 3 years.^{7,8} Previously infected person shows limited to protect themselves from reinfection. Studies have also shown that patients with more severe illness and prolonged viral shedding had higher antibody titers with longer protection.⁹

Our patient showed increased symptom severity and more lung involvement during his re-infection. Prior case reports showed that patients with mild or asymptomatic disease appear more likely to get re-infected.⁴

Conclusion:

A major limitation of our case study is that we were unable to undertake any assessment of the immune response like; antibody test because antibody test still not approved by our government. We also could not assess the effectiveness of the immune responses (eg, neutralizing antibody titers) against SARS-CoV-2 during his infective episodes. Neutralizing antibody assessment is a mandatory component to understand the immune response to both natural infection and vaccination. Previous exposure to SARS-CoV-2 might not guarantee total immunity to reinfection. All individuals, whether previously diagnosed with COVID-19 or not, should take proper precautions to avoid infection with SARS-CoV-2. More multi centered study should carry out to understand its immunogenicity.

Conflict of interest: Authors have no conflict of interest.

References:

1. Hanif M, Haider M, Ali M, et al. Reinfection of COVID-19 in Pakistan: A First Case Report. *Cureus* October 26, 2020;12(10): e11176. DOI 10.7759/cureus.11176.
2. Cucinotta D, Vanelli M: WHO declares COVID-19 a pandemic. *Acta Bio Med.* 2020;91:157-160. 10.23750/abm.v91i1.9397.
3. WHO Bangladesh COVID-19 Morbidity and Mortality Weekly Update (MMWU). 24 January 2021/Vol. No 48. [[https://www.who.int/bangladesh/emergencies/coronavirus-disease-\(covid-19\)-update](https://www.who.int/bangladesh/emergencies/coronavirus-disease-(covid-19)-update)].
4. Selvaraj V, Herman K, Dapaah-Afriyi K. Severe, Symptomatic Reinfection in a Patient with COVID-19. *RHODE ISLAND MEDICAL JOURNAL*, December 2020;103; 24-27.
5. Van Elslande J, Vermeersch P, Vandervoort K, et al. Symptomatic SARS-CoV-2 reinfection by a phylogenetically distinct strain. *Clin Infect Dis.* 2020 Sep 5: ciaa1330. doi: 10.1093/cid/ciaa1330. Epub ahead of print. PMID: 32887979; PMCID: PMC7499557.
6. Zhao J, Yuan Q, Wang H, et al. Antibody responses to SARS-CoV-2 in patients of novel coronavirus disease 2019. *Clin Infect Dis* 2020.
7. Payne DC, Iblan I, Rha B, et al. Persistence of antibodies against Middle East respiratory syndrome coronavirus. *Emerg Infect Dis* 2016; 22:1824–1826.
8. Guo X, Guo Z, Duan C, et al. Long-Term persistence of IgG antibodies in SARS-CoV infected healthcare workers. *MedRxiv* 2020.
9. Choe PG, Perera RAPM, Park WB, Song K-H, Bang JH, et al. Mers-Cov antibody responses 1 year after symptom onset, South Korea, 2015. *Emerg Infect Dis* 2017;23:1079–1084.