

## Case Report

## A Case Report of COVID-19 Re-Infection

Muhammad Imran Hasan Khan<sup>1</sup>, Tayyaba Shaheen<sup>2</sup>, Tanzeelah Shamshad<sup>3</sup>

<sup>1</sup> Professor, Department of Medicine,  
Fatima Jinnah Medical University, Lahore.

<sup>2,3</sup> Postgraduate Resident, Medical Unit-3,  
Lahore General Hospital, Lahore.

### Author's Contribution

<sup>1</sup> Conception of study

<sup>1,2,3</sup> Experimentation/Study conduction

<sup>1</sup> Analysis/Interpretation/Discussion

<sup>1</sup> Manuscript Writing

<sup>1,2,4,5,6</sup> Critical Review

<sup>1,2,4,5,6</sup> Facilitation and Material analysis

### Corresponding Author

Dr. Muhammad Imran Hasan Khan

Professor,

Department of Medicine,

Fatima Jinnah Medical University,

Lahore.

Email: mimranhkhan@hotmail.com

### Article Processing

Received: 02/01/2021

Accepted: 06/04/2021

**Cite this Article:** Khan, M.I.H., Shaheen, T., Shamshad, T. A Case Report of COVID-19 Re-Infection. Journal of Rawalpindi Medical College. 31 Aug. 2021; 25 COVID-19 Supplement-1, 157-161.  
DOI: <https://doi.org/10.37939/jrnc.v25i1.1579>

**Conflict of Interest:** Nil

**Funding Source:** Nil

**Access Online:**



### Abstract

Coronavirus Disease 2019 (COVID-19) is caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-COV-2). It started from Wuhan city of China and now has become a pandemic all over the world, affecting the majority of countries. COVID-19 has caused 71.6 million cases worldwide till now, out of which 46.8 million recovered and 1.6 million died. In Pakistan, it affected 429 thousand population till now, out of which 374 thousand recovered and 8796 precious lives were lost, making fatality rate at 2%.

The spectrum of coronavirus disease continues to unfold as time passes. It has created health and economic crisis all over the world. Being a new virus means less information on behavior and a lot to learn for its immunity. It was assumed initially that reinfection was less likely. Once exposed, we will develop antibodies and will be safe. But now we have a case of Covid-19 reinfection, depicting that despite exposure and having IgG Antibody titer, reinfection occurred within 6 months.

**Keywords:** Coronavirus disease, Reinfection, Case report, Antibodies.

## Introduction

Coronavirus Disease 2019 (COVID-19) is caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-COV-2).<sup>1</sup> It started from Wuhan city of China and now has become a pandemic all over the world, affecting the majority of countries.<sup>2</sup> COVID-19 has caused 71.6 million cases worldwide till now, out of which 46.8 million recovered and 1.6 million died.<sup>3</sup> In Pakistan, it affected 429 thousand population till now, **out of which 374 thousand recovered and 8796 precious lives were lost, making fatality rate at 2%.** <sup>4</sup> Recently, we documented a case of COVID-19 reinfection in healthcare professionals despite having acquired and documented infection from June 2020, through both qualitative and quantitative antibodies of IgG. Bao et al,<sup>5</sup> documented immunity in monkeys after primary infection of SARS CoV 2, in April 2020, but it remained questionable if this protection will persist in humans. Roy et al<sup>6</sup> documented 3 cases of reinfection, with CT changes, when their PCR and IgM were negative and IgG were positive at the time of discharge. The PCR was positive again at the time of reinfection. They also documented 80 different genotypic variants of this virus.

It, therefore, makes this case report significant because our subject demonstrated the previous infection. The antibody levels were also available in between, suggesting a falling titer. Hence making it the first reinfection case report from the region to my knowledge, as this occurred in December 2020. However, it remains that cases of reinfection are becoming very common with this virus.

## Case Presentation

52-year-old male, clinician by profession, had few Gastrointestinal symptoms in early April 2020. Features settled in few days. In June 2020, qualitative antibody titers were carried out. IgM was negative, but IgG was positive, suggesting exposure to Covid-19 (Table 1). In August, his IgG levels were tested again quantitatively, in the hospital set up as part of research work being carried out, and levels were found positive again, but at low levels (Table 1). Considering exposed and developed antibodies, and no other clinical features, he continued to work as usual with SOP's.

On 4<sup>th</sup> December 2020, he developed rhinorrhea, excessive lacrimation, sneezing, and cough. The temperature was recorded up to 100 F. Since he was a known asthmatic, the immediate standard protocol for

allergic asthma was initiated. On 8<sup>th</sup> December, his saturation started to fall, for which he reported in emergency immediately.

Other than asthma, he did not have any history of Diabetes, Hypertension, Smoking, surgery, or any other habituation. However, being on the clinical side, his exposure to Covid-19 patients was very strong. The usual protection of mask and hand sanitization was always followed.

## Results

It was worth noting that the Neutrophil lymphocyte ratio (NLR) was 3.409 at admission, and later increased during illness, since methylprednisolone was started. Inflammatory markers like CRP were reduced from 111 to 52 and 12.5 at discharge. Ferritin increased from 551.7 to 581.7 and 620. LDH reduced from 781 to 525 and 382. IgG antibody level which was 1.5 in August 2020, rose to 9 on the second day of admission, and 12 at the time of discharge. RT-PCR was positive from the time of admission. A high IgG antibody titer within few days of acquiring fresh COVID-19 infection was indicative of memory cells from previous exposure, yet not able to prevent it. D-dimer levels remained normal throughout (Table 2).

**Table: 1 Antibody Markers from First Infection**

Laboratory Markers	01.06.20	10.08.20
Covid Antibody Levels	IgG Strongly Positive IgM Negative Only available at that time	IgG Positive Positive Weak Titer 1.5 Cut off 1.0

**Table: 2 Laboratory Markers from Second Infection**

Laboratory Markers	08.12.20	10.12.20	14.12.20
Hemoglobin	16.5	15.8	16.7
WBC	9.1	15.1	13.2
Platelet	152	198	300
N	75	92	89
L	22	5	10
E	1	0	0
B	2	3	1
Bilirubin	0.80	0.8	0.81
SGPT	38	33	68
SGOT	35	37	42
Alkaline P04	323	242	286

Serum Sodium			139
Serum Potassium			4.1
Uric Acid		6.3	
BSR	154	160	223
HCT	51.2	47.8	50.98
Urea	29	76	68
Creatinine	1.1	1.4	1.3
Calcium		9.5	
CRP	111.7	52.4	12.5
Ferritin	551.7	581.7	620
LDH	784	525	352
D-Dimer	0.5	0.23	0.26
Covid Antibody IgG	1.5	9	12
RT PCR Covid-19	August 2020		
CPK			156

**HRCT Chest Report Dated 08.12.2020:**

Areas of consolidation with air bronchograms in the right upper and lower lobe and left lower lobe apical segment, mainly peripheral distribution. Also patchy peripheral, subpleural areas of ground-glass opacities were appreciated in both upper and lower lobes. No pleural effusion was seen on either side. No bronchiectasis or fibrotic changes were seen on either side.

The final Impression was that CT features were of bilateral patchy areas of consolidation and ground-glass opacities. Suggested PCR to rule out COVID-19 infection.

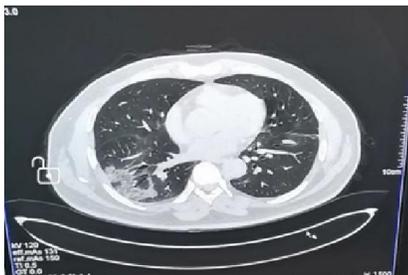


Figure 1:

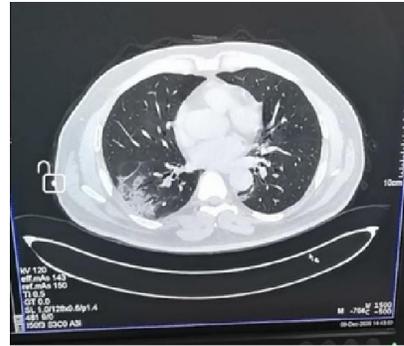


Figure 2:

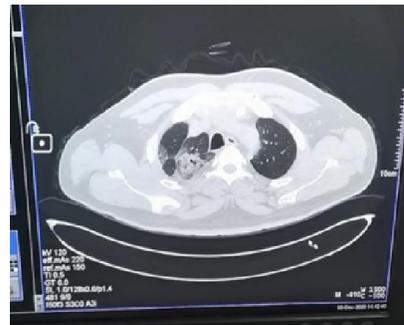


Figure 3:

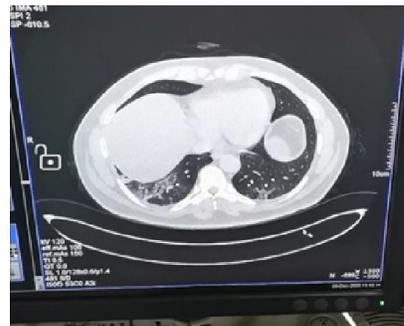


Figure 4:



Figure 5:



Figure 6:

## Discussion

Is it possible to get immunity against Covid-19 infection? The question remains unanswered. We had learned a lot during this one year of pandemic, but is it all? Or there is still more to catch up on?

Madan and Kunal<sup>7</sup> wrote in a letter to the editor regarding reinfection or relapse of COVID-19 infection. Their dissatisfaction over the conclusion was based on multiple factors including pre and post COVID-19 features comparison. Our case report has addressed that part, as our patient had already documented laboratory positive parameters. Although these titers were falling, with reinfection, there was a significant rise with positive PCR and radiological and biochemical evidence. HRCT and PCR were alone sufficient to confirm reinfection, but a sudden rise in antibody titer further confirmed a second infection. It remained questionable, if it was the reactivation of previous infection, or a new variant, which requires more clinical research.

Jeyanathan et al<sup>8</sup> have documented that the development of immunity to a pathogen through natural infection is a multi step process that can take weeks. The body responds immediately with a non-specific innate response by macrophages and neutrophils which are followed by an adaptive response that makes antibodies that specifically binds to Virus spike proteins. Later T-cells recognize and eliminate other infected cells (cellular immune response). So, following COVID-19 infection, Immunoglobulins should be formed and immunity to further reinfection should be present. But it is novel to COVID-19 that we have reported reinfection despite being positive for immunoglobulins.

So, firstly, this behavior of virus has to be studied and researched, that whether every infected person mounts an immune response and how long protective immunity will last? (How long and how strong protection is?). Animal studies indicated a protective response to reinfection. It is yet to be established that

how much antibody titer is protective for the prevention of reinfection.<sup>9</sup>

Secondly, is there a new strain of virus in circulation in our population? Or virus has mutated? This should be researched whether Reinfection occurred with the same strain of virus or with a different strain.<sup>10</sup>

Thirdly, laboratory tests need further validation including a rapid immunodiagnostic tests for accuracy and reliability. There is a need to distinguish between past infection of COVID-19 and other six known human coronaviruses out of which four cause common colds and circulate widely.<sup>11</sup> These viruses may produce antibodies that cross-react with antibodies produced in response to infection with COVID-19.

## Conclusion

Currently, there is not enough evidence of antibody-mediated immunity. Our case may be a case of COVID-19 reinfection. So, personal protection and preventive measures remain primary preventive methods. Reliability, accuracy, and protection from the presence of Antibodies have to be established. Also, this case report raises the question on vaccination of different types, relying on the development of IgG antibodies post-vaccination.

## Acknowledgement

I would like to thank my parents, wife, children, and family for bearing this tough time of admission with me. I would also like to thank Lahore General Hospital staff, Nurses and paramedics, and Ameer-ud-din Medical College Faculty and staff, especially Medical Unit-3 and Pulmonology department for the unconditional love and affection. I am indebted to my students, social media friends, and childhood friends, who prayed day and night for me. I dedicate this case report for the reader to make their own decision about which information to believe in this time of uncertainty, with a lot of misleading information around for COVID-19.

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