Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/19697
DOI URL: http://dx.doi.org/10.21474/IJAR01/19697

RESEARCH ARTICLE

EVIDENCE FOR REINFECTION WITH SARS-COV-2: A CASE SERIES STUDY

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Manuscript Info

Manuscript History
Received: 23 August 2024
Final Accepted: 25 September 2024
Published: October 2024

Abstract

Protective immunity conferred by COVID-19 (severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is unknown and reinfection with SARS-CoV-2 is not studied well. There are few case reports for reinfection with COVID- 19 which put a question marks on long lasting immunity after COVID- 19 infection. We present five cases with reinfection with SARS-CoV-2.Their age range 25-37years-old, all are united Arab Emirates (UAE) resident with no travel history for the previous year tested positive for SARS-CoV-2 during a community screen campaign.All tests were done by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swabs obtained from the patients. The course of disease in the three patientsranging from mild symptoms to asymptomatic. They had multiple SARS-CoV-2 negative test result between April 2020 to October 2020 before reinfection.Thedurations between first and second infections ranging from three to six months.Hence, we suggested that individuals with the previous infection with SARS-CoV-2 don't have long3lasting immunity against reinfections and general precautions are advised for individuals with previous SARS-CoV-2 infections.

Introduction:-

The Covid 19 pandemic aroused in china in early 2020 andthen spread to all continents. This pandemic affected all generations and produced a global heath burden. SARS-CoV-2 infection still have unanswered questions[(1)]. It still not clear whetherlong lasting Immunity and generations of antibodies following SARS-CoV-2 infections will provide immune protection against reinfections and for how long.[(2,3)]

Case reports of SARS-CoV-2 secondary infections have been published in many countries like Netherlands, Ecuador, Hong Kong and Belgium.(7,8,9)

The question also remains with the immunity and degree of infections as it has been reported that patients with pneumonia have better immune response than patient with asymptomatic infections. [(4)]Non-SARS coronaviruses reinfection has been reported after one year of infection.[(5,6)]

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Cohort studies have suggested thatantibody levels may fall substantially with time after infection, influenced byfactors such as the severity of initial illness, age and co-morbidities and this can explain reinfection.19–20

Methods:-

CASE NO. 1 In April 2020,37 years old male patient from Pakistan, resident in Dubai, UAE, not known to have any chronic medical illnesses was discovered during community campaign to have SARS-CoV-2 infection by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab. Thepatient was asymptomatic and clinical examination was unremarkable and lab tests were within normal limits.The patient stayed two weeks in isolation and was discharged following testing negative twice by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab after one week of isolation. Patient did again test negative in June 2020, and in October 2020 he repeated the test during another community campaign and he tested positive by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab. In second reinfection patient was asymptomatic and discharged after 10 days of isolation. And the patient's pattern of SARS-CoV-2 is revealed in table 1.

Table 1:-

Component	NOVEL CORONAVIRUS RNA PCR SWAB
Latest Ref Rng & Units	Not detected (Negative)
5/4/2020	**Detected (Positive) (A)**
12/4/2020	Not detected (Negative)
14/4/2020	Not detected (Negative)
22/6/2020	Not detected (Negative)
11/10/2020	**Detected (Positive) (A)**

Table 2:-

Component	NOVEL CORONAVIRUS RNA PCR SWAB
Latest Ref Rng & Units	Not detected (Negative)
20/4/2020	**Detected (Positive) (A)**
5/5/2020	**Detected (Positive) (A)**
10/5/2020	**Detected (Positive) (A)**
15/5/2020	**Detected (Positive) (A)**
21/5/2020	**Detected (Positive) (A)**
26/5/2020	**Detected (Positive) (A)**
1/6/2020	**Detected (Positive) (A)**
6/6/2020	**Detected (Positive) (A)**
11/6/2020	**Detected (Positive) (A)**
16/6/2020	**Detected (Positive) (A)**
21/6/2020	**Detected (Positive) (A)**
26/6/2020	Not detected (Negative)
28/6/2020	Not detected (Negative)
2/7/2020	Not detected (Negative)
7/7/2020	Not detected (Negative)
5/9/2020	**Detected (Positive) (A)**
17/9/2020	Not detected (Negative)
19/9/2020	Not detected (Negative)
19/10/2020	**Not detected (Negative)**

Case No.2in late April 2020, 29 years old male local patient from Dubai, UAE, not known to have any chronic medical illnesses. The patient presented to Hatta Hospital, Dubai, UAEwith fever, sore throat, rhinorrhea, ageusia and anosmia. Patient denied any cough, shortness of breath or diarrhea. The Patient was admitted to the hospital and investigations revealed SARS-CoV-2 infection by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab. Examinations were unremarkable. Chest X-ray is normal and lab tests were within normal ranges. Apart from mild lymphopenia,the patient received supportive treatment and his condition improved and was discharged for home isolation. In September 2020 patient repeat the test during community campaign and tested positive by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab. He was asymptomatic and sent again for home isolation. The patient pattern of Covid test revealed in table 2.

Case No 3,in late June 2020, 25 years old female local patient from Dubai, UAE. The patient presented to Hatt Hospital with mild dry cough,and she denied any fever, sore throat, shortness of breath,ageusia, anosmia or diarrhea. Examinations were unremarkable with normal chest X-ray and lab tests within normal ranges. Apart from mild elevation in CRP to 13.9 mg/L (REF: less than 5). She was sent for home isolation and 10 days later she had two successive negative swabs.On September 2020, the patient repeat the test during a community campaign and resulted positive by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab.She was asymptomatic and was sent again for home isolation and tested negative after 12 days. The patient's pattern of Covid-19 tests revealed in table 3.

Table 3:-

Component	NOVEL CORONAVIRUS RNA PCR SWAB
Latest Ref Rng & Units	Not detected (Negative)
23/6/2020	**Detected (Positive) (A)**
3/7/2020	Not detected (Negative)
5/7/2020	Not detected (Negative)
7/7/2020	Not detected (Negative)
5/9/2020	Not detected (Negative)
12/9/2020	Not detected (Negative)
17/9/2020	**Detected (Positive) (A)**
29/9/2020	Not detected (Negative)
30/9/2020	Not detected (Negative)
7/10/2020	**Not detected (Negative)**

Procedures:-

Qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab.

Result:-

First case was diagnosed on 5th of April 2020 during community campaign he was asymptomatic and tested negativethree times in 12th of April 2020 , 14th of April 2020 and 22nd of June 2020, again tested positive on the 11th of October 2020 were he was asymptomatic. All tests were done by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab.The durations between two positive occasions is six months and 6 days.

The second case was diagnosed on the 28th of April 2020 and he was symptomatic and continued to have positive result till the 21st of June 2020. The first negative result following the first occasion onthe 26th of June 2020 and continued to test negative for 4 teststill the7th ofJuly 2020. The second occasion of positive result reported on the 5th of September 2020 and he reported negative on the 17th ofSeptember 2020, 19th ofSeptember 2020 and 19th ofOctober 2020. All tests were done by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab. The durations between first and second occasion is four months and 8 days.

The third case was diagnosed on the 23rd of June 2020 and she was symptomatic and tested negative on the 3rd of July 2020 and had 5 negative results till the 12th ofSeptember 2020. The second occasion of positive result was on the 17th of September 2020 and the patient was asymptomatic and then tested negative for three times on the days

29th of September 2020, 30th of September 2020 and 7th of October 2020. All tests were done by qualitative PCR test for SARS-CoV-2 RNA through Nasopharyngeal swab. The durations between two occasions is two months and 25 days.

Discussions:-

Protective immunity conferred by COVID-19 is unknown and reinfection with SARS-CoV-2 is not studied well. wereported five cases of reinfection with COVID-19 reported in UAE. They were either asymptomatic or having mild symptoms.Our result agreed with the studies done in Netherlands and Hong Kong where reinfection was not associated with severity of infections. (17, 18). On other hand studies from Ecuador and USA reported that the second occasions were more severe than first one.(15,16)

Reinfection in our patients occurs after 3 to 6 months.Duration of immunity in other reported cases

Case NO. 2 and case NO. 3 showed mild symptoms in the first occasion and all three cases were asymptomatic on second occasions.

Ourfive cases are immune competent and none of them received any immune suppressant medications and all of them did HIV test once they were diagnosed with SARS-CoV-2.

Our second possibility is that our patients in the first positive occasions had their symptoms varying from asymptomatic to mild infections and it was reported that asymptomatic or mild case has low level of antibodies compared to patient with pneumonia who have better immune response.(4)

Our third possibility is that our patientswere infected with another COVID-19 strain and infection with one strain does not provide immunity to other strains, thus further genomic tests are required.(16)

In conclusion, reinfections with SARS-CoV-2 are being reported worldwide and we still have a small number of cases. We need to study the implication of reinfection for COVID-19 vaccine and further studies are needed to be done.

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