



Case report

The first case of documented Covid-19 reinfection in Israel

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ABSTRACT

We describe the first documented case of Covid-19 reinfection in Israel, out of only a handful such case worldwide, in a 20 year old otherwise healthy young woman. In the first occasion she was mildly symptomatic, whereas the second episode was apparently asymptomatic, except for tachycardia of 90/min, compared to 60/min in the first episode. The fact that out of 25 million infected persons worldwide only a handful of re-infected cases have been identified suggests that this is a rare phenomenon. Alternatively, it will be critical to rule out that new mutations are not introduced, which are not covered by existing immunity.

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Introduction

After 25 million confirmed Covid-19 infections worldwide [1], a major question has been whether reinfections with this virus are possible, potentially endangering the lives of people who recovered from this deadly virus and people who are in contact with them. It has been generally assumed that once infected, individuals mount immune response that prevents a second infection in the same individual [2]. The possibility of reinfection, if occurs, has significant clinical implications, as it may mean that the concept that people who have recovered from Covid-19 may not be susceptible again, is flawed.

This month the first cases of reinfection have been described in the lay media, but these have not been peer reviewed yet [3]. In Hong Kong details of the case of a 33-year-old man reveal that he first tested positive for COVID-19 in late March 2020 and developed cough, sore throat, fever and headache. He made a full recovery with negative viral tests, but again tested positive for COVID-19 while traveling home from Europe in mid-August. This time, he did not have any symptoms. This patient did not exhibit Covid-19 antibodies after his first bout of COVID-19 but did develop antibodies after his reinfection [3].

In the US, a 25-year-old man in Nevada contracted COVID-19 in March, recovered in April, and got sick again in May. Unlike his first,

mild symptoms, he experienced worse symptoms during the second bout, leading to hospitalization. Two additional cases have been reported in Belgium and in the Netherlands [4]. In Ecuador the genome of a re-infected case was compared to the first one and was found to be different [5]. The individual presented in May with a mild condition whereas the reinfection resulted in a moderate infection.

We describe a case of confirmed Covid -19 reinfection in Israel, where the infection rates have been among the highest worldwide [6].

Case

A 20 year old, otherwise healthy young woman was diagnosed with Covid -19 on April 17, 2020 in the city of Beney- Berak, where rates of infections have been among the highest in the nation. Her mild symptoms included fever and cough, with no evidence of respiratory distress or other symptoms. Being in the community, no chest x ray was performed and blood count was normal. A positive nasopharyngeal PCR test swab was confirmed twice and she was isolated in a facility designated for mild symptomatic cases. On May1 and again on May 10 her tests were negative and she was allowed to return home.

During the first week of August 2020, after enjoying three months of health, some of her family members were symptomatic for Covid -19 and were tested positive by PCR, and her own tests were positive on August 6 and again 5 days later. She did not have symptomatology, including intact respiratory system, no fever or gastrointestinal symptoms and a normal appetite. Her pulse was 97/min during rest with oxygen saturation of 96 %. During her first

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bout of Covid-19 her heart rate was consistently 55–62/min, whereas during the second bout in August it was consistently 92–99/min. Viral serology on August 11 revealed positive SARS-Covid-2 IgG antibodies. She was put in isolation with other family members. We did not sequence the genome of the Covid-19 on PCR specimens collected at the 2 different times.

Discussion

As of August 31, 2020, the total global Covid-19 infection burden was 25,387,330, with 6,827,399 active infections, 17,709,331 recoveries and 850,600 deaths [1]. The fact that till late August 2020 no viral and immunological documentation of reinfection has been described anywhere attests to the rarity of this phenomenon.

According to the World Health Organization at this point in time in the pandemic, there is insufficient evidence attesting to the effectiveness of antibody-mediated immunity to guarantee that people are risk-free [2]. People who assume that they are immune to a second infection because they have received a positive test result, may develop false hopes.

It has been expected that if the immune response generated after an initial infection could not prevent a second case, then it should at least stave off more severe illness [7]. Unlike the American and Ecuadorian cases, this is what has occurred with the Hong Kong man, as well as in our Israeli case.

It has been repeatedly presumed that people would become vulnerable to Covid-19 again some time after recovering from an initial disease, based on how the immune system typically responds to other respiratory viruses, including other coronaviruses [2]. It is possible that these early cases of reinfection are outliers and have features that won't apply to millions of other people who have already recovered from Covid-19.

In the American and Ecuadorian cases, researchers sequenced viral samples and found they were different genetically, providing evidence that the re-infection stems from viral mutations.

Generally, people who contract Covid-19 develop a healthy immune response of both antibodies and T cells, similar to other viral infections [7]. However, infections and the immune responses they induce in different people are heterogeneous. An important question for reinfection, with the most serious implications for controlling the pandemic, is whether re-infected people can transmit the virus to others. This question has not been addressed in the few confirmed re-infected cases

There are now communities, where more than 20 % of residents have experienced an initial Covid-19 case, and are thus assumed to be theoretically protected from another case for some time [2]. The novel discovery of reinfection casts some doubts on this assumption.

The fact that out of 25 million infected persons worldwide only a handful of re-infected cases have been identified, suggests that this is a rare phenomenon. Alternatively, it will be critical to rule out that new mutations are being introduced, which are not covered by existing immunity.

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Consent

Consent was obtained.

Author contribution

VN: Treating and follow up of the patient and tallying all data; RF: Oversaw the study; SM conducted the sampling; GK conducted the analysis and wrote the first draft.

Declaration of Competing Interest

The authors report no declarations of interest.

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