

Low level immunoglobulinG (IgG) in reinfection case COVID-19 in Bengkulu

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Abstract. The SARS-CoV-2 pandemic is underway and million people have been infected. We report a confirmed case of COVID-19 whose oropharyngeal swab test of SARS-CoV-2 RNA and have positive PCR test after 8 weeks declare negative result of PCR test SARS-COV-2. Immunoglobulin G not detection in first infection. In this study we discus about possibility low IgG in reinfection case.

1. Introduction

Reinfection case with COVID-19 is rare, with only a handful cases reported among 42 million cases in the world. Reports reinfection case COVID-19 have been reported in Hongkong, Netherlands, Belgium, Ecuador, Israel, China, Pakistan, Israel and Australia(1). Recent reports of patient re-testing positive even after resolved symptoms and negative testing raise questions about possibility of reinfection(2).

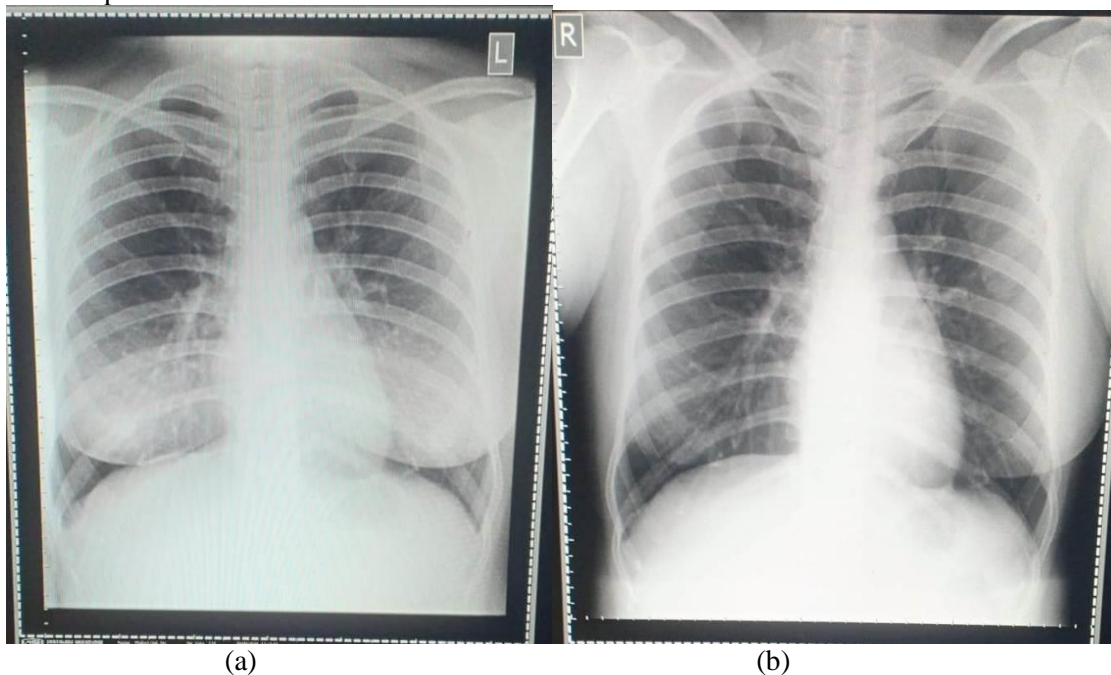
We would like to discuss the implications to antibody persistent of reinfection in context of immunology specifically in Bengkulu. Knowledge about reinfection would help the population maintain control measures, thus reduce the proportion of the population reinfected and possibility of presenting complications of the disease in its second episode.

2. Report

An 27-year-old female with a history positive COVID-19 in September 2020. In November 2020 the patient was admitted to the hospital with a febris, anosmia, ageusia dan productive cough since 4 days before. She didn't feel out of breath. The patient presents oxygen saturation of 98%. On auscultation, normal. A RT-PCR from nasopharyngeal swab for COVID-19 became positive on November 4th 2020. A

X-Ray Thorax showed that pneumonia in pulmo dextra compatible with a typical patient pattern on SARS-CoV-2 pneumonia. (Figure 1)

In September 2020, she had tested COVID-19. A RT-PCR from nasopharyngeal swab for COVID-19 became positive. She didn't feeling any symptoms. She is in asymptomatic case COVID-19. She declare cured after 3 weeks. Routine blood test showed normal result. A X-Ray Thorax not showed pneumonia in pulmo dextra and sinistra.



X-Ray Thorax (a) first infection (b) reinfection

IgG and IgM antibody titers were measured using the IFA method. The results showed that the IgM level 4 weeks after the first infection was 0.04, while no IgG was formed yet. After the second infection was declared cured, the IgG antibody titer formed was 67.69 and after 4 weeks it decreased to 1.34. Meanwhile, IgM antibody levels decreased from 0.27 to 0.7 after the fourth week of recovery

3. Discussion

Here we present a case a patient previously recovered from COVID-19 who demonstrated symptoms and radiographical findings with slowly titer Immunoglobulin G SARS-CoV-2 in second episode infections. The current case is a symptomatic case. In the reinfection case she was feeling febris, anosmia, productive cough. But she did not present symptoms in first infection. The current case did not present with pneumonia in the first infection. However, she presents with pneumonia in her second infection, with more than 50 days between episodes. In some countries, such Columbia the National Institute of Health have provided 90 days between both episodes as an epidemiological criteria for reinfection case, in addition to confirmation by Rt-PCR for SARS-CoV-2, regardless if symptomatic or asymptomatic episodes.

SARS-CoV-2 reinfection remains to be fully clarified. There are some report case of patients test positive again after clinical recovery and negative PCR test.(3) Some studies, this finding is attribute to

PCR false negative result discharge, SARS-CoV-2 long-term shedding and increase virus replication after clinical recovery.(4) This the most common alternative proposed explanation to true infection include prolonged viral shedding and inaccurate testing.(5) Many cases of dynamic RT-PCR results patients clinically improved at the time of repeat positive testing, this is question like true infection. Many viruses demonstrate prolonged presence of genetic material in a host even after clearance of the live virus and symptomatic resolution.(6, 7)

Based on Assessment brief ECDC 2020 to assessing a reinfection confirmed COVID-19. Positive PCR test at second episode must assessment with epidemiological data and sequence data. Epidemiological data used to match the symptom free periods between episodes and negative test PCR between two episodes. Another test to determine possible reinfection is a sequence data. Sequence data belong to different genetic clades or lineages and phylogenetic is a strain local of location exposure.(8)

The protective role of antibody or T-cell-induced immunity against SARS CoV-2 is still not understood. So, antibody titres usually correlate with antiviral immunity and anti-receptor domain antibody levels are known to link to plasma viral neutralization antibody(8). In this reinfection patient case, the level of anti-SARS-CoV-2 IgG after the first recovery status is zero or unreactive. There is another report about recovered COVID-19 patients with recurrent viral RNA exhibit lower levels of anti-receptor binding domain(RBD)of SARS-Coronavirus(9). After evaluate the effect of specific antibodies on recurrent RNA-positive status and compared the levels of anti-SARS-CoV-2 IgG to the S, RBD, HR1–HR2, N, and M proteins in these patients during their convalescent period, the results showed that RP patients induced significantly lower levels of anti-RBD IgG than PRN patients(9). Then, there are 3 main mechanism for reinfection : the immune response can be ineffective, strain-specific, or short-lived(10).

In the first positive COVID-19 confirmation, the clinical feature of patient is asymptomatic. However, in the second positive COVID-19 confirmation, patient experience mild-symptom COVID-19 manifestation. A study noted that even if the anti-bodies do not protect from reinfection, they do protect against severe forms of the disease.(11) This reinfection/reactivation indicates that a virus-eliminating immune response to SARS-CoV-2 may be difficult to achieve(12).

Another study noted that the increases in antibodies were not always accompanied by RNA clearance and antibody may not be sufficient to clear the virus, especially in critical patient(13). SARS-CoV-2 has been known to form escape mutation which may correspond to reduction in immunoglobulin binding capacity(3). There are hypothesis about a potential mechanisms for the relapse of COVID-19 infection similar to many other viruses, SARS-CoV-2 utilizes exosomal and extracellular vesicle cellular transport avenues for reproduction and intra-host spreading as a mode of systemic virus dissemination, so, it's a reasonable explanation for appearance of the viral RNA in the recovered COVID-19 patients post-negative-PCR result(12).

4. Conclusion and Recommendation

Reinfection represents a new clinical epidemiological challenge in COVID-19. Serologi test for patient who had recoveres needs to be carried out for one month for antibody surveillance to face the possibility of reinfection in patients whose antibody levels are low after recovery.

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