

The Covid-19 Antibody Titer of Convalescence Plasma Repeated Donors at Red Cross Indonesia of Tulungagung Regency

Ni Luh Putu Eka Sudiwati¹, Rachmadi Yuwana Kusuma², Ardi Panggayuh³, Nia Lukita Ariani⁴

^{1,2,3,4}Blood Bank Technology Study Program, Applied Health Science Department, Poltekkes Kemenkes Malang, Indonesia

ABSTRACT

Convalescent plasma is plasma that is already present in the body and includes anti-SARS-CoV-2 antibodies. This plasma includes antibodies that may kill viral particles, thereby preventing virus entrance into cells. This neutralizing procedure has an effect on the improvement of a patient's clinical state after receiving convalescent plasma treatment. The possibility of this convalescent plasma therapy as a treatment for individuals infected with SARS-CoV-2 has been evaluated, and clinical trials are still ongoing. The aim of this study is to determine the antibody titer of the donor. The research was a descriptive study. Total sample was 25 repeated male donors. The data of their IgM and IgG levels was obtained from Management Information System at Red Cross Indonesia Of Tulungagung Regency. Data was presented as table. The mean IgG level of repeated convalescent plasma donors is higher than the mean IgM level. The mean IgM level of repeated convalescent plasma donors is often constant. The mean IgG level of convalescent plasma donors increased through the fifth donor and then declined from the sixth to the ninth donor. The mean result of IgM and IgG has decreased by a higher proportion than it has increased.

ARTICLE DETAILS

Published On:
02 December 2022

Available on:
<https://ijmscr.org/>

INTRODUCTION

The current Coronavirus (Covid-19) pandemic continues to affect the majority of the globe, including Indonesia. Indonesia has recorded its first incidence of COVID-19 since March 2020. In Indonesia, there have been 6.627.538 confirmed cases of COVID-19 with 159.524 deaths (data collected from <https://covid19.who.int/region/searo/country/id>) based on the number of Covid-19 cases registered by WHO until November 2022. To combat this COVID-19 case, various therapy approaches are being evaluated since then. Convalescent Plasma Therapy, one of the alternative treatments for COVID-19, has been made available to the public. This treatment utilizes blood plasma from COVID-19 patients who have recovered.

Convalescent plasma therapy is the delivery of passive polyclonal antibodies (Ab) to produce rapid immunity. It has been used for over a century to prevent and cure several infections. Passively transmitted antibodies can eliminate both viral infections and infected cells, in addition to their involvement in virus suppression (Sukohar & Zetira, 2020). The antibodies against COVID-19 survivors who have recovered can only persist for up to ten months after the first

infection (Widiyarti, et al., 2021). Convalescent plasma therapy is administered to COVID-19 patients by the administration of convalescent plasma from a person who has recovered from COVID-19 and possesses antibodies in the expectation that these antibodies may neutralize the virus in the patient. The transfusion can enhance clinical and laboratory effects in patients with severe diseases (Triyono & Sukorini, 2020).

In COVID-19 survivors with severe or critical conditions, their antibodies have a higher response and last longer than in patients with mild or asymptomatic symptoms. COVID-19 survivors in severe, critical condition or who are hospitalized are given top priority as convalescent plasma donors. This is because to ensure the high levels of antibodies contained, unless there is an agreement on donor plasma antibody testing (Mardian et al., 2020).

At the time of convalescent plasma donation, survivors had IgG (Immunoglobulin G) anti-SARS-CoV-2 antibody titers of more than 1:320. In addition to having high antibody titers, survivors must meet the same requirements as regular blood donors, including having normal blood pressure, being physically fit, and having an adequate body

The Covid-19 Antibody Titer of Convalescence Plasma Repeated Donors at Red Cross Indonesia of Tulungagung Regency

mass. The antibody titers of COVID survivors will diminish within three to four months. A typical survivor may only donate blood a maximum of 10 times (CNN Indonesia Team, 2021). IgG antibodies are a specific type of antibody produced in people with COVID-19. When the body detects a foreign material or antigen, the antigen is recorded by white blood cells, which subsequently produce IgE antibodies to combat the exposure.

OBJECTIVES

To examine about the antibody titer of the donor and whether it will be increased, remains constant, or decreased.

METHODS

This research was a descriptive study. Donors who had recovered from COVID-19 and completed blood collection from the donor screening procedure between May and August 2021 were the subjects of this research. The sample technique used was total sampling. The antibody titer results

for Covid-19 convalescent plasma donors at Red Cross Indonesia Of Tulungagung Regency were used as secondary data. Researchers performed data analysis using the percentage formula. Secondary data of antibody titer levels for COVID-19 convalescent plasma donors were analyzed and presented as tables and graphs in this study.

There were three main procedures in this research as follow

1. Research preparation by getting research permit from Applied Health Science Department, Poltekkes Kemenkes Malang and submitting it to Red Cross Indonesia Of Tulungagung Regency
2. Research implementation by taking data from the Management Information System at Red Cross Indonesia Of Tulungagung Regency
3. Research evaluation by performing data analysis

RESULTS

The total sample is 25 people. All subjects are male. Table 1 depicts the detail of respondents' age.

Table 1. Distribution of Respondents' Age

Age	n	%
22 years old	2	8
23 years old	1	4
24 years old	1	4
25 years old	1	4
27 years old	1	4
28 years old	1	4
29 years old	1	4
30 years old	1	4
31 years old	1	4
32 years old	1	4
33 years old	1	4
34 years old	2	8
36 years old	1	4
38 years old	1	4
37 years old	1	4
41 years old	2	8
43 years old	1	4
49 years old	1	4
52 years old	1	4
54 years old	2	8
56 years old	1	4
Total	25	100

Repeated donors of 25 total subjects is at most 3 times as many as 9 people (36%), and only 1 person (4%) donated

repeatedly as much 9 times. Table 2 depicts the detail of donor frequency.

Table 2. Donor Frequency of Respondents

Donor Frequency	n	%
3 times	9	36
4 times	8	32
5 times	4	16

The Covid-19 Antibody Titer of Convalescence Plasma Repeated Donors at Red Cross Indonesia of Tulungagung Regency

6 times	3	12
9 times	1	4
Total	25	100

The findings of the Covid-19 antibody titer testing yield two types of mean values: the mean IgM value and the mean IgG value. Based on the collected mean data, the seventh donor had the highest mean IgM value, 196, while the fifth donor had the highest mean IgG value, 1240. In addition, the results revealed the lowest mean IgM and IgG values. The fourth donor yielded the lowest mean IgM value, 106.7,

while the ninth donor yielded the lowest mean IgG value, 720. On the basis of these data, the percentage rise and reduction in IgM and IgG levels were calculated for each plasma donation. The results obtained showed a rise of 33.3% and a drop of 66.6% in the mean IgM value. In the meantime, the mean IgG value acquired data with a 22.2% increase and a 77.7% drop. Table 3 depicts the detail.

Table 3. The mean value of IgM and IgG

Donor frequency	Mean IgM Value	Mean IgG Value
1	180,7	911
2	145,7	907,8
3	120,2	836,2
4	106,7	878,8
5	112,1	1240
6	121	990,8
7	196	942
8	193	807
9	166	720

DISCUSSION

The mean antibody titer value of 25 respondents or donors was determined. The mean result of the acquired antibody titers is the mean value of IgM and IgG. The seventh donation had the greatest average IgM value of 196, whereas the fifth donation yielded the highest average IgG value of 1,240. The graph also displays the lowest average IgM and IgG readings. The fourth donor had the lowest average IgM value with a value of 106.7, and the ninth donor had the lowest average IgG value with a value of 720. According to Table 2, 66.6% of the mean IgM value has declined since the total number of donors, while 33.3% has risen. In contrast, the data on the mean IgG value revealed a bigger percentage drop, that is, 77.7% of total donor activity, while 22.2% had an increase.

Once IgG has already been produced within the body, its presence might be permanent. IgG levels might change based on the state of the body. After one week of infection, IgG antibodies will be generated, and their levels can grow with recurrent viral attacks and drop when the body's state is stable. In contrast to IgG, IgM levels in the body remain relatively steady throughout time (Indonesia.go.id, 2020).

IgM production begins to drop around the fourth week of infection and disappears three weeks later. IgM production that persists for more than one month is indicative of a prolonged SARS-CoV replication period in individuals with acute infection. IgG, unlike IgM, can survive for a longer length of time; IgG from SARS-CoV can be identified up to 24 weeks after infection. Studies indicate that IgG and neutralizing antibodies might remain

for up to two years following infection. This suggests that IgG may offer protection against recurring infections (Wasitystuti et al., 2020). Covid-19 antibody titers in repeated convalescent plasma donors increased due to the existence of covid-19 immunization in these donors.

Based on the following data presentation, there is consistency between the research findings and the current hypothesis. According to the research data, the mean result of IgM and IgG has decreased by a bigger proportion than it has increased. Because the Covid-19 virus was not found in the body, the percentage decline in IgM and IgG values was larger, therefore the majority of the average IgM and IgG levels fell each time the donor was used. The average IgM and IgG levels rose when the virus was discovered in the body of the donor or respondent following immunization. When the donor is vaccinated, the body will respond to the identification of the virus in the body by increasing the concentrations of IgM and IgG.

CONCLUSIONS

The mean IgG level of repeated convalescent plasma donors is higher than the mean IgM level. The mean IgM level of repeated convalescent plasma donors is often constant. The mean IgG level of convalescent plasma donors increased through the fifth donor and then declined from the sixth to the ninth donor. The mean result of IgM and IgG has decreased by a higher proportion than it has increased.

The Covid-19 Antibody Titer of Convalescence Plasma Repeated Donors at Red Cross Indonesia of Tulungagung Regency

REFERENCES

- I. Indonesia.go.id. (2020). Test Kit Covid-19 Bukan Asal Cepat, Perlu Jaminan Akurat. <https://indonesia.go.id/kategori/indonesia-dalam-angka/1725/test-kit-covid-19-bukan-asal-cepat-perlu-jaminan-akurat>.
- II. Mardian Y; Sugiyono, R.I; Werni, S; Suratri, M.A.L; Irmansyah. (2020). Uji klinis pemberian pkasma konvalesen sebagai terapi tambahan Corona Virus Disease 19 (COVID-19)-PlaSenTer. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. Laporan.
- III. Sukohar A; Zetira, S. (2020). Manfaat Terapi Plasma Konvalesen Pada Infeksi Covid-19. 10, 333–340. Artikel Jurnal.
- IV. Tim CNN Indonesia. (2021). Kisah penyintas covid yang sudah 10 kali donor plasma. CNN Indonesia.
- V. Triyono, T & Sukorini, U. (2020). *Seputar Transfusi Darah Saat Pandemi Covid-19 Frequently Asked Question (FAQ)*. Departemen Patologi Klinik dan Kedokteran Laboratorium Fakultas Kedokteran, KMK Universitas Gadjah Mada.
- VI. Wasitystuti, W; Dhamarjati, A; Siswanto. (2020). Imunosenesens dan Kerentanan Populasi Usia Lanjut Terhadap Coronavirus Disease 2019 (Covid-19). 4 Nomor 3, 182–191. Artikel Jurnal.
- VII. Widiyarti Y, ed. (2021). Penelitian ungkap berapa lama antibodi Covid-19 bertahan. TEMPO.CO.