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Practical Analysis Antibiotics Use for Covid 19 Patients

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Abstract: *To evaluate the use of antibiotics and their effectiveness in COVID-19 patients including PCR, body temperature, SaO2, chest X-ray, respiratory rate, leukocytes, CRP, and LOS of COVID-19 patients at Bhayangkara HS Samsoeri Hospital Mertojoso Surabaya. This study is an observational study with a retrospective method in the period June 2020 to February 2021. Data were collected from Medical Records of COVID-19 patients who achieved antibiotic therapy, with standard therapy: antiviral (mild to moderate: Favipiravir-Ritonavir and severe: Remdesivir), antibiotics, vitamins, anticoagulants, corticosteroids, symptomatic and concomitant therapy. The study showed that 37% (25 patients) were female and 67% (41 patients) were male with the highest age range between 30-39 years. Most of the patients were hospitalized for 10-14 days and the longest hospitalization period was 40-44 days. In this study patients with mild cases were the most cases with a total of 36 patients (54%). The results of the analysis based on the 2020 Third Edition of the 2020 COVID-19 Handling Guidelines, the Bhayangkara Hospital Antibiogram data, clinical conditions and laboratory tests occurred in 66 patients (100%). Rational use of antibiotics in accordance with the COVID-19 Management Guidelines 3rd Edition and data from Bhayangkara Hospital antibiogram of 100% and antibiotics can help the healing process of COVID-19 patients proven by negative PCR results (91%), increased body temperature (100%), SaO2 (100%), chest x-ray (45%), respiratory rate (92%), leukocytes (77%), CRP (41%), and LOS.*
Keywords: *practical analysis; antibiotics; covid 19 patients*

I. Introduction

Coronavirus is a virus that belongs to the Coronaviridae family that can infect humans and animals. Coronaviruses are a great family of viruses which may cause illness in animals or Humans (Madandola, 2021). Coronaviruses are a great family of viruses which may cause illness in animals or Humans (Modeawi, 2020). Coronaviruses that infect humans can cause mild illnesses similar to the common cold to more severe diseases such as MERS (Middle East Respiratory Syndrome) and SARS (severe acute respiratory syndrome). During late 2019 and early 2020 many cases of novel coronavirus infection were reported in Wuhan, China. On January 7, 2020, the virus was identified by WHO as 2019-nCoV (WHO, 2020). Based on WHO, as of February 1, 2021, a total of 102,584,351 confirmed cases and 2,222,647 deaths were reported. In America there are 25,817,939 confirmed cases, India there are 10,757,610 confirmed cases, and Brazil 9,176,975 confirmed cases. In Indonesia as of February 1, 2021, a total of 1,089,308 confirmed cases and 30,277 deaths due to COVID-19 were reported. In Jakarta there were 269,718 confirmed cases with 4,273 deaths, in East Java there were 112,795 confirmed cases with 7,805 deaths, and in Central Java there were 125,355 confirmed cases and 5,043 deaths (Ministry of Health of the Republic of Indonesia, 2021).

Common signs and symptoms of COVID-19 infection are fever with body temperature above or equal to 38°C, dry cough and shortness of breath. The average incubation period is 5 to 6 days and the longest incubation period is 14 days. In acute cases

of COVID-19 it can cause pneumonia, acute respiratory syndrome, kidney failure, and even death. The clinical symptoms reported in the majority of cases were fever and some cases had difficulty breathing. Laboratory tests found that 25% of infected patients had leukopenia and 63% had lymphocytopenia (Grace, 2020). On CT-scan results, 100% of patients showed grinding glass resistance and in 98% found consolidation in the infected lung area (Wu et al., 2020).

COVID-19 infection causes excessive monocyte/macrophage activation followed by a cytokine storm and the appearance of acute respiratory distress syndrome. Lung inflammation, fever, and fibrosis are symptoms of COVID-19 mediated by the production of active IL1 by the toll like receptor (TLR) when interacting with pro-inflammatory cytokines such as IL-1b and IL-6 (Russell B, 2020). An increase in interferon gamma from type one T helper (Th1) lymphocytes (IFN-γ), inflammatory cytokines IL-1β, IL-6, and IL-12 occurred at least two weeks after SARS-Cov infection. In addition, an increase in IL-8 will initiate degranulation and the production of reactive oxygen species (ROS) which will induce oxidative stress.(Samir, 2020).

Based on the above background, it is necessary to carry out further analysis of the use of antibiotics in COVID-19 patients to determine the profile of antibiotic use and the effectiveness of antibiotics that will be carried out at Bhayangkara Hospital Surabaya in order to improve pharmaceutical services in hospitals.

The purpose of this study was to evaluate the use of antibiotics and their effectiveness in COVID-19 patients including PCR, body temperature, SaO2, chest x-ray, respiratory rate, leukocytes, CRP, and LOS at Bhayangkara HS Samsoeri Mertojoso Hospital Surabaya.

The results of the study are expected to provide an overview of the use of antibiotics in COVID-19 patients, can provide information to clinicians regarding the use of antibiotics in COVID-19 patients so that they can be used in the evaluation and monitoring of therapy for COVID-19 patients, can be used as a source of data and references for research. furthermore, and as a means to develop the insight and ability of researchers in compiling scientific papers.

II. Research Methods

This research is an observational research. The study design describes the profile of the use and effectiveness of antibiotic therapy in COVID-19 patients with retrospective-descriptive data collection.

Processing the data obtained to determine:

a. Data on the characteristics of COVID-19 patients receiving antibiotic therapy in tabular form.
b. Identification of drug dosing, drug administration routes, frequency, and duration of antibiotic therapy in COVID-19 patients presented in the form of percentages, tables, and diagrams.
c. Identification between the therapy obtained with clinical data and laboratory data.
d. Identification of the effectiveness of antibiotic therapy in COVID-19 patients.

III. Discussion

The research "Analysis of Antibiotic Use in COVID-19 Patients" conducted at Bhayangkara HS Samsoeri Mertojoso Hospital has the aim of analyzing the use of antibiotics and knowing the effectiveness of antibiotic therapy in COVID-19 patients and

has received research permission based on Research Permit number 09/IV/ 2021/KEPK/RUMKIT dated April 7, 2021 as listed in Appendix-2. This study is an observational study with a retrospective method in the period June 1, 2020 to February 28, 2021. The analysis was carried out by looking at the suitability of therapy with the COVID-19 Management Guidelines by PDPI and antibiotic sensitivity which can be seen in the Antibiogram data of Bhayangkara Hospital 2020.

Patient Demographics

a. Gender Profile

Table 1. Gender Profile

Gender	Number of Patients	Percentage (%)
Man	41	63%
Woman	25	37%
Amount	66	100%

109 patients of COVID-19 from mild to severe degrees and receiving antibiotic therapy, 43 patients were included in the exclusion criteria because they did not meet the established therapeutic standards. Thus, there were 66 patients who met the inclusion criteria consisting of 41 male patients and 25 female patients with percentages of 63% and 37%, respectively.

b. Patient Age Profile

Table 2. COVID-19 Patient Age Profile

Age	Number of Patients	Percentage (%)
< 19 years old	4	6%
19 – 29 years old	11	16%
30 – 39 years old	20	30%
40 – 49 years	13	19%
50 – 59 years	11	18%
60 years	7	11%

The age distribution of the patients can be seen in table V. 2. Age groupings were divided into 6 categories, namely less than 19 years, 19-29 years, 30-39 years, 40-49 years, 50-59 years, and more than or equal with 60 years. COVID-19 patients from mild to severe degrees who received antibiotic therapy were mostly experienced in patients aged 30-39 years.

c. Profile of Length of Hospitalization

Table 1. Inpatient Profile

Length of Hospitalization	Number of Patients	Percentage (%)
5 – 9 days	15	22%
10 – 14 days	31	46%
15 – 19 days	12	19%
20 – 24 days	5	7%
25 – 29 days	0	0%
30 – 34 days	1	2%

35 – 39 days	1	2%
40 – 44 days	1	2%

The length of stay of the patient is calculated from the date of MRS (Hospital Admission) to the date of KRS (Out of Hospital) which is shown in table V. 3. The patient is hospitalized for 10 – 14 days and the longest length of stay for the patient is 40 – 44 days.

d. Case Weight Profile

Table 2. Case Degree Profile

Level	Number of Patients	Percentage (%)
Light	36	54%
Currently	14	21%
Heavy	16	25%

According to the COVID-19 Management Guidelines, the severity of COVID-19 cases can be divided into asymptomatic, mild, moderate, severe, and critical. In this study, a study was conducted on patients with mild, moderate, and severe degrees. The profile of the severity of COVID-19 cases at Bhayangkara Hospital Surabaya is shown in table V.4.

e. Pattern of Antibiotic Use

Table 3. Pattern of Antibiotic Use

Antibiotics		Average Duration of Antibiotics (Day)	Level			Amount of Antibiotic Use (%)
			Light	Currently	Heavy	
Levofloxacin	(1 x 750 mg) iv	9	2	1	9	12 (18%)
	(1 x 500 mg) iv	7	1	0	0	1 (2%)
	(1 x 750 mg) po	3	0	1	0	1 (2%)
Moxifloxacin (1 x 400 mg) iv		1	0	0	1	1 (2%)
Azithromycin	(1 x 500 mg) iv	7	3	2	0	5 (8%)
	(1 x 500 mg) po	6	13	1	0	14 (21%)
Cefoperazone – Sulbactam (3 x 1 g) iv		6	1	0	0	1 (2%)
Ceftazidime (3 x 1 g) iv		8	1	0	0	1 (2%)
Meropenem	(3 x 1 g) iv	7.5	0	2	0	2 (3%)
	(3 x 1 g) po	6	0	1	0	1 (2%)

Ceftriaxone (2 x 1 g) iv	4	1	0	0	1 (2%)
Azithromycin (1x500 mg) iv → Azithromycin (1x500 mg) po	7	2	0	0	3 (4%)
Azithromycin (1x500 mg) iv → Levofloxacin (1x500 mg) po	9	1	0	0	1 (2%)
Azithromycin (1x500 mg) iv → Levofloxacin (1x500 mg) iv	10	0	0	1	1 (2%)
Azithromycin (1x500 mg) iv → Meropenem (3x1000 mg) iv	13	0	1	0	1 (2%)
Levofloxacin (1x750 mg) iv → Levofloxacin (1x750 mg) po	9	0	1	0	1 (2%)
Levofloxacin (1x750 mg) iv → Levofloxacin (1x500 mg) po	11	1	0	0	1 (2%)
Levofloxacin (1x500 mg) iv → Levofloxacin (1x750 g) iv	7	1	0	0	1 (2%)
Levofloxacin (1x500 mg) iv → Levofloxacin (1x500 mg) po	7	1	0	0	1 (2%)
Levofloxacin (1x750 mg) iv → Azithromycin (1x500 mg) po	10	1	0	0	1 (2%)
Ceftriaxone (2 x 1 g) iv → Cefoperazone – Sulbactam (3 x 1 g) iv	16	0	1	0	1 (2%)
Meropenem (3x1 g) iv → Levofloxacin (1x500 mg) po	11	0	1	0	1 (2%)
Levofloxacin (1x750 mg) iv → Meropenem (3x1g) iv	12	1	0	0	1 (2%)
Meropenem (2x1000 mg) iv → Meropenem (3x1000 mg) iv	7	0	1	0	1 (2%)
Moxifloxacin (1x400 mg) iv → Moxifloxacin (1x400 mg) po	12	0	0	2	2 (3%)
Cefoperazone – Sulbactam (3x1 g) iv → Levofloxacin (1x750 mg) iv	7	0	0	1	1 (2%)

Levofloxacin (1x750 mg) iv → Cefoperazone – Sulbactam (3x1 g) iv	11	0	0	1	1 (2%)
Levofloxacin (1x500 mg) iv → Levofloxacin (1x750 mg) iv → Azithromycin (1x500 mg) po	9	1	0	0	1 (2%)
Azithromycin (1x500 mg) po → Levofloxacin (1x500 mg) iv → Levofloxacin (1x500 mg) po	11	1	0	0	1 (2%)
Levofloxacin (1x750 mg) iv → Levofloxacin (1x1 g) po → Meropenem (3x500 mg) iv	19	0	1	0	1 (2%)

The administration of antibiotics to COVID-19 patients is associated with the incidence of bacterial superinfection in influenza cases, where 11-35% of influenza cases experience secondary bacterial coinfection, which is generally caused by bacterial infection of Streptococcus pneumoniae and Staphylococcus aureus (PDPI, 2020). A cohort study conducted in 2003 investigating patients infected with the SARS-CoV virus found more than 20% of patients had bacterial and fungal co-infections. These coinfected patients almost 70.6% received invasive therapy. Cases of bacterial and fungal co-infection were also found in patients infected with the SARS-CoV-2 virus.

The pattern of antibiotic use describes the use of antibiotics in inpatients diagnosed with COVID-19 at Bhayangkara Hospital which includes the type of antibiotic, the route of administration, and the dose of the antibiotic. The table of patterns of antibiotic use in COVID-19 patients can be seen in table V.5.

The antibiotic Azithromycin with a dose of 500 mg given po is the most widely prescribed antibiotic for COVID-19 patients, of which 14 patients received this antibiotic, of which mild COVID-19 patients received the most antibiotics. The administration of Azithromycin is listed in the COVID-19 Management Guidelines by the Indonesian Lung Doctors Association Edition 3 of 2020, where Azithromycin 500 mg can be given to COVID-19 patients from mild to severe degrees every 24 hours either iv or orally for 5 to 7 days. (PDPI, 2020). Azithromycin is an antibiotic belonging to the macrolide group that can increase the pH of the Golgi and recycle endosomes so that it can affect the activity and replication of the SARS-CoV-2 virus.

In addition to Azithromycin (1x500 mg) po, the antibiotic Levofloxacin (1x750 mg) iv is also widely used in COVID-19 patients at Bhayangkara Hospital where this antibiotic is the second most prescribed antibiotic. Levofloxacin (1x750 mg) iv is widely prescribed to patients with severe COVID-19 with a total of 9 patients receiving this antibiotic. Meanwhile, the number of mild and moderate COVID-19 patients who received Levofloxacin (1x750 mg) iv were 2 patients and 1 patient, respectively. Levofloxacin is a fluoroquinolone antibiotic that has been shown to have antiviral activity against vaccinia virus, papovavirus, human cytomegalovirus, varicella-zoster virus, herpes simplex virus types 1 and 2, hepatitis C virus, and HIV. In an in silico study it was found that the fluoroquinolone group can bind to the main protease (Mpro) of the SARS-CoV-2 virus and

indicates that fluoroquinolones can inhibit the replication of the SARS-CoV-2 virus (Marciniec et al, 2020).

Table 4. Results of Analysis of Antibiotic Use

Patient No	Antibiotics	Antibiogram	PDPI 3rd edition 2020	Information	Suitability of Use of Antibiotics
1	Azithryomycin (1 x 500 mg) po	□	□	Cough and fever for 3 days	In accordance
2	Azithromycin (1 x 500 mg) po	□	□	Anosmia since 5 days ago	In accordance
3	Azithromycin (1 x 500 mg) po	□	□	Cough for 1 month, fever, CRP above normal limits	In accordance
4	Levofloxacin (1 x 500 mg) po	□	X	Fever for 1 week, cough for the last 3 days, shortness of breath	In accordance
5	Levofloxacin (1 x 500 mg) iv → Azithromycin (1 x 500 mg) po	□	□	Fever for 1 week, coughing up blood, pneumonia	In accordance
6	Ceftriaxone (2 x 1 g) iv → Cefoperazone – Sulbactam (3 x 1 g) iv	□	X	Cough, nausea	In accordance
7	Cefoperazone-Sulbactam (3 x 1 g) iv	□	X	Fever, anosmia, weakness, CRP above normal limits	In accordance
8	Azithromycin (1 x 500 mg) po	□	□	Fever for 1 week, cough, runny nose, weakness, nausea, anosmia	In accordance
9	Levofloxacin (1 x 750 mg) iv → Azithromycin (1 x 500 mg) po	□	□	Weakness, fever, cough	In accordance
10	Azithromycin (1 x 500 mg) iv	□	□	Fever, cough with phlegm for 1 week	In accordance
11	Levofloxacin (1x750 mg) iv → Azithromycin (1 x 500 mg) po →	□	□	Fever for 3 days, cough cold	In accordance

	Azithromycin (1 x 500 mg) po				
12	Azithromycin (1 x 500 mg) iv → Azithromycin (1 x 500 mg) po	□	□	Fever and weakness for the last 4 days	In accordance
13	Azithromycin (1 x 500 mg) po	□	□	Fever, cough since 3 days ago	In accordance
14	Azithromycin (1 x 500 mg) iv	□	□	Fever since the last three days, nausea, dizziness	In accordance
15	Meropenem (3 x 1 g) iv	□	X	Fever for 7 days, anosmia, cough for 6 days, dizziness, pneumonia	In accordance
16	Meropenem (3 x 1 g) iv → Levofloxacin (1 x 500 mg) po	□	X	Cough, shortness of breath, pneumonia	In accordance
17	Levofloxacin (1 x 500 mg) iv → Levofloxacin (1 x 750 mg) → Azithromycin (1 x 500 mg) po	□	X	Fever, cough	In accordance
18	Levofloxacin (1 x 500 mg) iv → Levofloxacin (1 x 500 mg) po → Azithromycin (1 x 500 mg) po	□	X	Cough with phlegm since one week ago, runny nose, anosmia, decreased appetite	In accordance
19	Azithromycin (1 x 500 mg) po	□	□	Fever for 1 week, cough, runny nose, nausea, vomiting	In accordance
20	Azithromycin (1 x 500 mg) po	□	□	Anosmia since 5 days ago, coughing up white phlegm, nausea	In accordance
21	Ceftazidime (3 x 1000 mg) iv	□	X	Fever, cough, sore throat for 1 week	In accordance
22	Azithromycin (1 x 500 mg) po	□	□	Cough for 2 weeks, shortness of breath, two days ago the	In accordance

				swab result was positive	
23	Azithromycin (1 x 500 mg) po	□	□	Fever, dizzy eyes for 3 days, pneumonia	In accordance
24	Levofloxacin (1 x 750 mg) iv	□	X	Fever for 3 days, anosmia, nausea, runny nose, cough, bronchitis	In accordance
25	Ceftriaxone (2 x 1 g) iv	□	X	Fever since 1 week ago, dry cough, nausea, bronchitis	In accordance
26	Azithromycin (1 x 500 mg) po	□	□	Anosmia for 1 week, bronchitis	In accordance
27	Levofloxacinn (1 x 750 mg) iv → Meropenem (3 x 1000 mg) iv	□	X	Weakness, fluctuating body temperature, sore throat, cough, bronchitis, d-dimer value above normal limits (821 ng/mL)	In accordance
28	Levofloxacin (1 x 500 g) iv → Levofloxacin (1 x 500 mg) po	□	X	Fever for 2 days, sore throat, bronchitis	In accordance
29	Azithromycin (1 x 500 mg) iv → Azithromycin (1 x 500 mg) po	□	X	Body temperature fluctuating, chills, cough, runny nose, positive PCR result, bronchitis	In accordance
30	Meropenem (2 x 1 g) iv → Meropenem (2 x 1 g) po	□	X	Fever, body temperature fluctuating cough, runny nose since one week ago, body aches, nausea, diarrhea, pneumonia	In accordance
31	Azithromycin (1 x 500 mg) po	□	□	Fever, weakness, decreased appetite, positive PCR results, bronchitis	In accordance

32	Levofloxacin (1 x 500 mg) iv → Levofloxacin (1 x 750 mg) iv	□	X	Fever for 1 week, bronchitis	In accordance
33	Meropenem (3 x 1 g) po	□	X	Nausea, dry cough, dizziness, pneumonia	In accordance
34	Azithromycin (1 x 500 mg) po	□	□	Fever for 5 days, anosmia, runny nose, positive swab result two days ago, bronchitis	In accordance
35	Azithromycin (1 x 500 mg) iv	□	□	Fever, cough since 2 days ago, nausea, bronchitis	In accordance
36	Levofloxacin (1 x 750 mg) iv → Levofloxacin (1 x 750 mg) po	□	□	Fever 2 weeks ago, shortness of breath since 1 week ago, cough, pneumonia	In accordance
37	Levofloxacin (1 x 750 mg) iv → Azithromycin (1 x 500 mg) po	□	□	Sore throat, blocked nose 3 days ago, pneumonia	In accordance
38	Azithromycin (1 x 500 mg) iv	□	□	Fever since 2 days ago, nausea, sore throat, cough	In accordance
39	Azithromycin (1 x 500 mg) po	□	□	Fever, sore throat, dry cough, bronchitis	In accordance
40	Levofloxacin (1 x 750 mg) iv	□	□	Fever since 5 days ago, cough, runny nose, weakness, shortness of breath, nausea, bronchitis	In accordance
41	Levofloxacin (1 x 750 mg) iv → Levofloxacin (1 x 1000 mg) po → Meropenem (3 x 1g)	□	□	Fever, cough, runny nose, pneumonia	In accordance
42	Azithryomycin (1 x 500 mg) po	□	□	Fever, cough, runny nose,	In accordance

				dizziness, pain when swallowing, bronchitis	
43	Azithromycin (1 x 500 mg) iv	□	□	Fever, shortness of breath, fever, cough, bronchitis	In accordance
44	Azithromycin (1 x 500 mg) iv → Meropenem (3 x 1 g) iv	□	□	Fever, shortness of breath, dry cough, nausea, vomiting, diarrhea, pneumonia, cardiomegaly, comorbid DM and hypertension	In accordance
45	Levofloxacin (1 x 500 mg) iv	□	X	Anosmia, cough, shortness of breath, bronchitis	In accordance
46	Levofloxacin (1 x 750 mg) po	□	□	Fever, dry cough, anosmia, acute pain, increased vascular pattern	In accordance
47	Azithromycin (1 x 500 mg) po	□	□	Sore throat, shortness of breath, cough, bronchitis	In accordance
48	Azithromycin (1 x 500 mg) iv → Levofloxacin (1 x 500 mg) po	□	□	Fever, nausea, decreased appetite, cardiomegaly, bronchitis	In accordance
49	Meropenem (3 x 1 g) iv	□	X	Dry cough, sometimes shortness of breath, bronchitis, comorbid hypertension	In accordance
50	Levofloxacin (1 x 750 mg) iv	□	X	Fever, nausea, vomiting, weakness, bronchitis	In accordance
51	Levofloxacin (1 x 750 mg) iv	□	□	Cough with phlegm, weakness, positive PCR	In accordance

				results, bilateral pneumonia	
52	Moxifloxacin (1 x 400 mg) iv → Moxifloxacin (1 x 400 mg) po	□	X	Fever, shortness of breath, bilateral pneumonia, IL-6 values above normal limits (16.12 pg/mL), CRP values above normal limits (79.4 mg/L)	In accordance
53	Cefoperazone Sulbactam (3 x 1 g) iv → Levofloxacin (1 x 750 mg) iv	□	X	Fever for 4 days, cough, runny nose, shortness of breath, CRP value above normal limits (10.8 mg/L), bronchitis	In accordance
54	Levofloxacin (1 x 750 mg) iv	□	□	Fever, cough, runny nose, bilateral pneumonia	In accordance
55	Levofloxacin (1 x 500 mg) iv → Azithromycin (1 x 500 mg) iv	□	X	Diarrhea, fever, abdominal pain, bilateral pneumonia, IL-6 value above normal value (18.97 pg/mL)	In accordance
56	Levofloxacin (1 x 750 mg) iv	□	□	Fever, cough, weakness, nasal congestion, CRP value above normal limits (50.8 mg/L)	In accordance
57	Levofloxacin (1 x 750 mg) iv	□	□	Fever, cough with dyspnoea, dizziness, bilateral pneumonia, d-dimer value above normal (890 ng/mL)	In accordance
58	Levofloxacin (1 x 750 mg) iv → Levofloxacin (1 x	□	□	Fever for 1 week, cough, runny nose,	In accordance

	750 mg) po			swab results two days ago showed positive results, bilateral pneumonia, CRP value above normal limits (111.8 mg/L)	
59	Levofloxacin (1 x 750 mg) iv	□	□	Fever for 3 days, cough, runny nose, cardiomegaly, bilateral pneumonia	In accordance
60	Levofloxacin (1 x 750 mg) iv	□	□	Fever, heavy breathing, shortness of breath since two days ago, especially when coughing, bilateral pneumonia	In accordance
61	Moxifloxacin (1 x 400 mg) iv → Moxifloxacin (1 x 400 mg) po	□	X	Fever for 1 week, runny nose, cough, bilateral pneumonia	In accordance
62	Levofloxacin (1 x 750 mg) iv	□	□	Cough, shortness of breath, runny nose, bilateral pneumonia	In accordance
63	Moxifloxacin (1 x 400 mg) iv	□	X	Fever for 1 week, shortness of breath, nausea, vomiting, diarrhea, CRP value above normal limits (106.5 mg/L)	In accordance
64	Levofloxacin (1 x 750 mg) iv → Cefoperazone Sulbactam (3 x 1 g) iv	□	□	Cough with green sputum, weakness, bilateral pneumonia	In accordance
65	Levofloxacin (1 x 750 mg) iv	□	□	Fever, cough, nausea, cardiomegaly,	In accordance

				bilateral pneumonia, IL-6 value above normal limits (20.21 pg/mL)	
66	Cefoperazone Sulbactam (3 x 1 g) iv	□	X	Body temperature fluctuating, nausea, heartburn, cough, bilateral pneumonia, IL-6 value above the normal limit (10.74 pg/mL), CRP value above the normal limit (40.8 mg/L)	In accordance

Analysis of the use of antibiotics was carried out by looking at the suitability of therapy in the COVID-19 Management Guidelines 3rd Edition 2020, the Antibiogram data of the Bhayangkara Hospital 2020, and clinical conditions and laboratory results. According to the Guidelines for the Management of COVID-19 Issue 3 of 2020, patients with confirmed mild COVID-19 receive Azithromycin (1 x 500 mg) antibiotic therapy for 5 days and moderate to severe patients receive Azithromycin (1 x 500 mg) antibiotic therapy iv or PO. for 5 to 7 days or given Levofloxacin (1 x 750 mg) iv or po for 5 to 7 days.

From the results of the analysis, it was found that the use of antibiotics in COVID-19 patients was in accordance with the data of the Antibiogram of Bhayangkara Hospital Surabaya in 2020, the Guidelines for the Management of COVID-19, edition 3 of 2020, as well as clinical conditions and the results of laboratory examinations in 66 patients (100%). All use of antibiotics in COVID-19 patients is in accordance with the 2020 Bhayangkara Hospital Antibiogram, but there are still some uses of antibiotics in COVID-19 patients that are not in accordance with the COVID-19 Management Guidelines edition 3 of 2020. Use of antibiotics that are not in accordance with the degree the severity of the disease occurred in several patients, one of which was patient number 4. The patient was a mild COVID-19 patient, but was treated with Levofloxacin (1 x 500 mg) po. Meanwhile, according to the Guidelines for the Management of COVID-19, edition 3 of 2020, the administration of Levofloxacin therapy is started in patients with severe degrees. In addition, it was also found that the administration of several antibiotics such as Cefoperazone/Sulbactam, Meropenem, Ceftazidime, and Ceftriaxone were not included in the pharmacological therapy of COVID-19 patients in the COVID-19 Management Guidelines edition 3 of 2020.

Meropenem is a carbapenem class of antibiotics that works by inhibiting bacterial cell wall synthesis. Carbapenems are used in the treatment of patients with severe pneumonia including pneumonia in the elderly and have been shown to be effective in treating pneumonia (Oi I et al, 2019). The administration of meropenem can be seen in patient no. 49 who were 65 years old and had comorbid hypertension experienced a dry cough that was sometimes accompanied by shortness of breath. The examination showed

positive PCR results and the presence of bronchitis in the patient's lungs. The patient was also given 3 lpm nasal oxygen therapy. Although Meropenem is not included in the COVID-19 Management Guidelines edition 3 of 2020, the administration of Meropenem is in accordance with the complaints and results of laboratory examinations, especially the results of the patient's chest X-ray. In addition, other antibiotics that are not listed in the COVID-19 Management Guidelines 3rd edition 2020 can be seen in patient no. 66 who are 36 years old and come with complaints of body temperature up and down, nausea, cough, pain in the pit of the stomach. The results of the thorax examination showed bilateral pneumonia. This patient received Cefoperazone/Sulbactam therapy (3 x 1 g) and simple oxygen mask 10 lpm.

IV. Conclusion

From the analysis of the use of antibiotics in COVID-19 patients at Bhayangkara HS Samsoeri Mertojoso Hospital Surabaya in the period June 2020 to February 2021, the following conclusions were obtained:

1. The use of appropriate antibiotics according to the COVID-19 Management Guidelines Edition 3 of 2020 and the Bhayangkara Hospital Antibiogram data occurred in 100% of patients.
2. The administration of antibiotics was effective on the outcome as evidenced by the negative PCR results as much as 91%, body temperature improved by 100%, SaO2 improved by 100%, chest x-ray improved by 45%, respiratory rate improved by 92%, leukocytes improved by 77%, CRP improved as much as 41%, and LOS.

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