

# COVID-19 Disease Clinical Manifestations and Treatment Result Analysis

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**Abstract:** From March 2nd, 2020th, this hospital started as a hospital mainly for COVID-19 infections and has been continuously treating COVID-19 inpatients until now, January 5<sup>th</sup>, 2022th. From the beginning of February, 2020th, to January 5<sup>th</sup>, 2022th, the total cumulative number of confirmed COVID-19 cases in Korea was 649,669, the death toll was 5,838, and the mortality rate was 0.89%. The Korean quarantine system hospitalizes COVID-19 patients in the early stages of the (COVID-19) disease. We believe that it is due to this system that Korea has been able to keep a considerably low death rate compared to many other countries. In this paper, with data on 2,925 patients hospitalized from March 2, 2020 to September 30, 2021 at this hospital, this paper analyzes the disease patterns of patients, by analyzing clinical features and medication history of the patients and the existing diseases of the COVID-19 patients who were hospitalized in the hospital. The important thing is that Regdanimab (Regkirona) should administered as early as possible in the early stage of infection and Veklury (Remdesivir) also should be administered as soon as possible at the time when oxygen saturation starts to drop. It is believed that the current quarantine system in Korea, which allows patients to be treated in hospitals at the initial stage of diagnosis, lowered the death rate from COVID-19.

**Keywords:** Antiviral Drug, Monoclonal Antibody, Redganvimab and Veklury

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## 1. Introduction

Seoul Metropolitan Seobuk Hospital is a public hospital directly managed by Seoul Metropolitan Government, mainly serving as a dedicated tuberculosis hospital and providing generalized inpatient treatment and outpatient treatment mainly for elderly patients and vulnerable groups including the homeless and the disabled. From March 2nd, 2020th, This hospital started as a hospital mainly for COVID-19 infections and has been continuously treating COVID-19 inpatients until now, January 5<sup>th</sup>, 2022th. From the beginning of February, 2020th, to January 5<sup>th</sup>, 2022th, the total cumulative number of confirmed COVID-19 cases in Korea was 649,669, the death toll was 5,838, and the mortality rate

was 0.89%. The mortality rate in the United States and Europe is 1.5-2.5%, and the global fatality rate is estimated to be 1.97%. As of December, 2021th, South Korea has recorded about 7,000 daily confirmed cases, and the number of confirmed cases in the Seoul and Gyeonggi-do region accounts for about 64% of country's total cases. Until now, Korea's quarantine system prioritizes infectious disease hospitals for COVID-19 patients those over 60 years of age and those with pre-existing diseases even at a young age (12/02/2021 Data Source in Seoul city: 7 public hospitals, 20 other private hospitals, 1,813 COVID-19 patients are hospitalized). Among the patients who tested positive for COVID-19, if they are under 60 years old and do not have special medical conditions, priority is given to living

treatment centers in Seoul. (12/02/2021 Data source in Seoul city: 15 living treatment center in Seoul, 3,578 people are quarantined in living treatment center).

They are quarantined and are given personal simple oxygen saturation check monitor and antipyretics. As a hospital dedicated to infectious diseases in Seoul, the main hospital is filling up the hospital beds in the COVID-19 patients. All COVID-19 related hospitals have been continuing to treat many COVID-19 patients during last 2 years in Korea. However, in this December 2021th in Korea, as the number of COVID-19 patients surged to more than 5,000 every day in Korea, hospital beds for severe COVID-19 patients became full and then hospitals cannot receive more COVID-19 patients. And then home treatment increased. In early period of 2021th, in Korea, COVID-19 vaccine was given priority to the elderly (including in nursing homes) and to the vulnerable groups (including nursing homes for the homeless and the disabled). Since September 2021th, those who have completed vaccines started being hospitalized as confirmed cases of COVID-19, and as of December 2021th, full vaccinated COVID-19 patients numbers were nearly 50% of all hospitalized patients, so the government is rapidly implementing a third vaccine (boosting shot). Currently, 80% of the population has completed the second round, and now the focus is on receiving the third vaccine, and the low vaccination rate among adolescents and teen agers can be seen as the reason for the recent surge in COVID-19 patients. In fact, in general, it is expected that the course and clinical manifestations of the COVID-19 disease will be different with age or underlying chronic disease, but this was not necessarily the case. Although the young patients had no pre-existing disease and were very young and healthy, there were many cases where the course of the disease called COVID-19 progressed very quickly, rapidly and severely. In the case of elderly patients with many chronic diseases, there were many cases where they overcame the disease called COVID-19 without any major problems. In this paper, with data on 2,925 patients hospitalized from March 2, 2020 to September 30, 2021 at this hospital, this paper analyzes the disease patterns of patients, by analyzing clinical features and medication history of the patients and the existing diseases of the COVID-19 patients who were hospitalized in the hospital. By summarizing the treatments and treatment results, including medications, we would like to share and suggest ways to understand and cope with the disease called COVID-19.

## 2. Materials and Methods

Seoul Metropolitan Seobuk Hospital is one of the first hospitals to become main hospital for COVID-19 among various national and public hospitals in Seoul from March 2020th as a public hospital in Seoul. From March 2020th to August 2020th, one or two wards were operated as COVID-19 patients, and from August 2020th to the present, 7-8 wards were operated by 12-14 specialists from each department (internal medicine, surgery, family medicine, neurology departments,

thoracic surgery, pediatrics, etc.) continue to treat inpatients with COVID-19. Nowadays 12/2, 2021th, 27 hospitals are in operation in Seoul, with 7 public hospitals in Seoul and 20 hospitals as private and national hospitals dedicated to COVID-19 treatment. According to the 12/2, 2021th data, 1,813 people are being hospitalized in 27 hospitals, and 3,578 people are quarantined at 15 community treatment centers under city government and 20 community treatment centers under the district. In addition, when a family hospitalization is necessary with small children or when a family member needs nursing care, they are assigned to a hospital in the form of a family bed. Home treatment, which is assigned through the consultation of epidemiological investigators and quarantined as a COVID-19 patient at one's own home according to one's own wishes, has increased significantly in these days because lack of hospital capacity. In some ways, it is a situation that can be called home treatment and waiting for hospitalization. In recent years, patients over the age of 60 have also been transferred to community treatment centers, and oxygen saturation has dropped and problems have arisen in the community treatment centers, so there has been an increase in the number of cases where they are transferred back to COVID-19 dedicated hospitals. As soon as COVID-19 inpatients were diagnosed through COVID-19 test, they were given inpatient treatment at an infectious disease hospital or quarantine treatment at living treatment centers. All treatment costs at quarantined living expenses or infectious disease hospitals are fully supplied by the government while the COVID-19 test is positive, and COVID-19 patients could be hospitalized with free of charge. In the case of other countries, including the United States, most of them receive hospital treatment only when the disease called COVID-19 has become more severe and treatment such as oxygen therapy or ventilator become necessary. However, in Korea, the quarantine system in Korea has been and is still operating in such a way that isolation and treatment begin within 1-2 days after positive COVID test, if possible, at a life treatment center or a hospital dedicated to COVID-19, from the moment the COVID-19 test is positive. But recently, it has become impossible with more than 7,000 confirmed cases per day.

In this paper, we intend to analyze the patient charts of 2,925 patients who received inpatient treatment from March 2, 2020th to September 30, 2021th, as a hospital dedicated to COVID-19 infections.

Patient status by age Table 1, gender status Table 2, and patient status according to patient's nationality Table 3 are explained in the subject and method.

**Table 1.** Status of inpatients by age from March 2, 2020 to September 30, 2021.

Age division	Number of patients
1-10yrs	168
11-20yrs	141
21-30yrs	273
31-40yrs	368
41-50yrs	337
51-60yrs	510
61-70yrs	733
71-80yrs	361

Age division	Number of patients
81-90yrs	34
Sum	2,925

**Table 2.** Status of inpatients by gender from March 2, 2020 to September 30, 2021.

Gender	Number of patients
Male	1,482
Female	1,443
Sum	2,925

**Table 3.** Status of inpatients by nationality from March 2, 2020 to September 30, 2021.

Nation	Number of patients
South Korea	2881
China	14
USA	7
England	4
Vietnam	4
Nepal	3
Mongolia	2
Iraq	1
Bangladesh	1
China (Korean)	1
Pakistan	1
India	1
Australia	1
Saudi Arabia	1
Thailand	1
Senegal	1
Overseas Korean	1
Sum	2,925

### 3. Results

In this paper, we analyzed the patient charts of 2,925 patients who received inpatient treatment from March 2, 2020th to September 30, 2021th as a hospital mainly for COVID-19 infectious diseases. From Table 4 to Table 11, the tables classified diagnosed diseases by institution, we want to talk about the underlying diseases of COVID-19 patients who were hospitalized. It is difficult to clearly distinguish between existing diseases and newly diagnosed disease during hospitalization, and in many cases these diagnosis names overlap with the clinical features of COVID-19.

I would like to talk about the impact of these treatments (especially Regdanvimab and Veklury and Dexamethasone) by looking at the presence or absence of pneumonia among COVID-19 patients, the degree of pneumonia, and data on oxygen therapy and antibiotic treatment. [15]

By analyzing the data related to the use of drugs by COVID-19 patients and the data according to the results of treatment, I would like to talk about the effects of the drugs, especially monoclonal antibody Regdanvimab (Regkirona) and anti viral drug Veklury (Remdesivir) and dexamethasone that are clinically judged to have an impact on the treatment process of the disease called COVID-19. [14]

From Table 4 to Table 11, 2,925 patients hospitalized from March 2, 2020 to September 30, 2021 included some diagnoses with underlying diseases and newly diagnosed diagnoses while staying in the hospital. Tables that summarize the diagnosis names for each institution.

**Table 4.** Cardiovascular comorbidities.

Underlying or newly diagnosed disease	Numbers of patients
Hypertension and hypertensive heart disease	818
Hyperlipidemia	531
Coronary artery disease and complications (angina, myocardial infarction, etc.)	85
Unspecified arrhythmias (atrial fibrillation, tachycardia, bradycardia, atrioventricular block, etc.)	67
deep vein thrombosis	63
Artificial valve and coronary artery, presence of aortic implant, aortic aneurysm, etc.	18
Other heart failure (pulmonary edema, pericardial effusion)	12

As a companion underlying disease, the most common cardiovascular diseases were hypertension and hyperlipidemia, and coronary artery disease, arrhythmias, and artificial valves. Patients who had coronary artery implants were common. The COVID-19 disease itself caused a lot of disease patterns in which the association

between the onset of cardiovascular diseases and thrombus formation increased during the hospitalization period of 2-3 weeks. The frequency of overall cardiovascular diseases also increased, creating a situation that required medication. In most cases, the medication was continued even after discharge. [2, 8]

**Table 5.** Respiratory comorbidities.

underlying or newly diagnosed diseases	Number of patients
Asthma, unspecified	54
Respiratory infection sequelae and tuberculosis sequelae	38
Chronic obstructive pulmonary disease and emphysema bronchitis	35
Atelectasis	27
Pulmonary nodule, pulmonary embolism	17
bronchiectasis with bronchiectasis, bronchial stenosis	12
Interstitial lung disease	4

As an accompanying underlying disease, respiratory diseases such as chronic obstructive pulmonary disease, emphysema, tuberculosis sequelae, asthma, and

bronchiectasis were common. For all patients hospitalized for COVID-19, chest CT scans check the course of the disease, so the underlying lung disease also can be known. After 5-7

days of COVID-19 infection, due to changes in the personal immune system, the normal bacteria in the oropharyngeal area have change of infectivity and severity as germs, and another viral pneumonia and bacterial pneumonia caused by COVID-19 infection. Therefore, the administration of antibiotics were often necessary. When the sputum spit from the patients was cultured at the time of admission, the *Pseudomonas* strain was most commonly cultured, and this

strain sensitive to tazoperan and third-generation cephalosporins. Although the degree of pneumonia varies from person to person, from within 10% of lung volume to more than 60-70% of severe pneumonia, it usually changes during 2-3 weeks of hospitalization by antibiotics and general supportive care. Changes in the lung can be confirmed through low dose CT. Even if the pneumonia improved, sequelae as like fibrosis could be remained in some cases. [7]

**Table 6.** Endocrine comorbidities.

underlying or newly diagnosed diseases	Number of patients
Diabetes mellitus with unspecified complications	447
Thyroid postoperative status, thyroiditis, hypothyroidism	52
Prediabetes and glucose tolerance	24
Hyperthyroidism, Graves' disease	15

Diabetes mellitus was the most common endocrine disease as a companion underlying disease, and many patients were hospitalized and diagnosed with diabetes, and there were many people whose blood sugar temporarily rose like impaired glucose tolerance. COVID-19 disease itself tends to raise blood sugar overall. In addition the

extreme stressful situation can be viewed as a situation in which diabetes is easily developed along with continuous stimulation of the sympathetic nervous system. In addition, there was a lot of increase in blood sugar due to the use of the treatment itself (dexamethasone) during the treatment of COVID-19 disease. [1]

**Table 7.** Kidney and urinary system comorbidities.

underlying or newly diagnosed diseases	Numbers of patients
Prostatic hypertrophy and prostatitis	81
Persistent proteinuria, unspecified renal failure	42
Urinary tract infection, stones, and hematuria	24
Electrolyte abnormalities (hyperkalemia, hypokalemia)	6
kidney transplant status	1

**Table 8.** Chronic Infectious Diseases and Allergic Diseases.

underlying or newly diagnosed diseases	Number of patients
Unspecified skin allergy, rash, drug, environment	65
Herpes zoster	9
Chronic allergic rhinitis	7
late syphilis	7
Psoriasis	5
Behcet's disease, ulcerative proctitis	4
celiac disease	1
systemic lupus erythematosus	1
Ankylosing Spondylitis	1

As an accompanying underlying disease, there were quite a few patients with chronic kidney failure who continued to take medication and diet, although prostate-related diseases and dialysis treatment were not performed among renal and urinary system diseases. And the disease called Corona itself causes a lot of problems with persistent high fever, difficulty

in eating, and dehydration. During the epidemic period of Corona, there were many cases of dehydration, acute renal failure, and electrolyte abnormalities. [10]

Chronic infectious diseases and autoimmune diseases as accompanying underlying diseases, such as late syphilis, psoriasis, Behcet's disease, ulcerative proctitis, lupus, and ankylosing spondylitis, were patients who had stable conditions with chronic and long-term treatment. There were cases where it was originally an underlying disease, but there were also skin rashes that were newly developed during hospitalization due to COVID-19. Patients' reactions to the COVID-19 itself are often felt as a reaction of individual immunity and individual allergy or anaphylaxis. However, it was difficult to decide or predict that patients with chronic allergies or autoimmune diseases, as existing diseases, reveal to more severe pneumonia or not due to sensitive reactions such as anaphylaxis. [3-6]

**Table 9.** Chronic Hematological Tumor Diseases.

underlying or newly diagnosed diseases	Number of patients
Thyroid malignant neoplasia postoperative status	24
Unspecified iron deficiency anemia, nutrient deficiency anemia	22
Postoperative status of malignant neoplasm of the breast	22
Colon and rectal malignant neoplasms postoperative status	10
Postoperative status of malignant neoplasm of the prostate	8
Chronic myelogenous leukemia, hematologic cancer, MDS, multiple myeloma, etc.	8
Gastric cancer postoperative status	6
Lung cancer, small cell lung cancer	5

underlying or newly diagnosed diseases	Number of patients
Kidney cancer postoperative status	4
Postoperative condition for cervical cancer	4
Postoperative status for head and neck cancer, Postoperative status for brain tumor	3
Gallbladder Cancer Postoperative Condition	3
Tonsil cancer postoperative condition	1
Secondary Thrombocytopenia	1

As a comorbid underlying disease, chronic tumor diseases are mostly patients who have completed surgery and chemotherapy within the last 5 years and are currently only following up. In some cases, chronic myeloid leukemia patients temporarily stopped their leukemia treatment drugs and received public treatment related to the COVID-19 disease. There are many cases where the blood test findings at the moment when the amplification of the COVID-19

virus in the body is similar to leukemia laboratory finding or sepsis finding. In particular, when the fever is very severe and the inflammatory reaction is severe for a long time, there were a significant number of patients who had a temporary decrease in platelet and a decrease in neutrophil count that appeared to be sepsis in blood tests, but then normalized again as the COVID-19 recovered without other specific treatment.

*Table 10. Chronic digestive system diseases.*

underlying or newly diagnosed diseases	Number of patients
Elevated Liver Levels and Toxic Hepatitis	155
Chronic hepatitis B and C	133
Gastric ulcer, drug-induced gastroenteritis and colitis, esophageal reflux, esophagitis	96
Cholelithiasis, condition after gallbladder removal. cholecystitis	9
Acute and chronic pancreatitis	8
Liver cirrhosis, biliary cirrhosis	8
After peritonitis surgery, after hernia surgery, after appendix surgery, after colostomy	6
Chronic Constipation	5
Hepatitis A	2

It can be seen that the most common diagnosis during hospitalization or accompanying underlying disease of confirmed COVID-19 patients is liver function elevation due to liver inflammation, that is, toxic hepatitis due to COVID-19. In severe cases, the elevation increased to more than 10 times the normal level in some cases.

After COVID-19 treatments including antiviral agent and monoclonal antibody, and time over with this disease, liver function test slowly to normalize during 2-3 wks.

Most of the patients said that liver function tests were normal

before admission. Even in patients with existing chronic diseases such as hepatitis B, hepatitis C, and cirrhosis, they were patients who maintained their liver levels at normal levels by taking antiviral drugs for the existing hepatitis before the onset of COVID-19. During the hospitalization period, the most common digestive symptoms were diarrhea and nausea and vomiting and poor oral intake. In case of very severe diarrhea, Loperamide was used, and there was usually some improvement with the almagate agent, and with the recovery of the COVID-19 disease itself, it showed improvement with digestive organ-related symptoms.

*Table 11. Chronic neuropsychiatric diseases and disorders.*

underlying or newly diagnosed diseases	Number of patients
Schizophrenia, bipolar disorder, anxiety disorder, panic disorder	70
Cerebral blood vessels, cerebral infarction, cerebral lesions due to trauma, cerebral aneurysm	50
Alzheimer's dementia and Parkinson's dementia	27
Sleep Disorders	27
Epilepsy, encephalopathy, including epilepsy. cerebral palsy	11
physical disability	8
Intellectual disability	5
Autism Disorder	3
Visual disability	3
Developmental disability	3
obsessive compulsive disorder	1

Cerebrovascular disease and psychiatric disease as comorbid underlying diseases were long-term chronic diseases, and were patients who had to be hospitalized with the caregiver or family member due to a comorbid condition or disability. There were difficulties in communication and isolation due to psychiatric problems and disabilities with bedridden status but we did not think

that the existing underlying diseases had a lot of influence on the clinical picture and severity of COVID disease itself. We would like to talk about oxygen therapy for COVID-19 patients. Patients were admitted to the hospital and had a self-saturation check machine to check and record the saturation several times a day. When the oxygen saturation in room air was less than 94%, oxygen therapy was given.

Oxygen was sometimes used intermittently for chest tightness without dropping of saturation monitor. In the case of using oxygen, oxygen saturation cannot be maintained over 94% in room air, we can use oxygen with 1L/min -7L/min through the nasal cannula or reservoir mask, as the pneumonia improves, oxygen is tapered and stopped at the time of discharge. In order to be discharge without oxygen, the patient had to check saturation in room air without oxygen more than 95% for more than one day. In addition, if oxygen saturation cannot be maintained over 95% by using a reservoir mask of 7L/min due to a high oxygen demand, we use a high flow O<sub>2</sub> supply machine, this machine which has nasal cannula and more powerful oxygen supply possible. We start usually at FiO<sub>2</sub> 0.5 and flow 50, we can increase FiO<sub>2</sub> and flow level. If the pneumonia improved, we could change with nasal O<sub>2</sub> and then tapered with nasal O<sub>2</sub>, the patient was finally able to be discharged without oxygen within 2-3 weeks. If there was no improvement even if FiO<sub>2</sub> was continuously increased, and then we were referred to the university hospital because of the possibility of intubation, ventilator using, and ECMO using. The purpose of this study is to analyze data on treatment drugs for COVID-19 patients. In most cases, X-rays were hardly visible unless the pneumonia was very severe. When pneumonia occurred, the increase or decrease of pneumonia over time could be confirmed with low-dose chest CT by taking two or three images during the hospitalization period. COVID-19 patients who were hospitalized from early March 2020th to July 2020th were usually young and came from abroad, and there were many patients who did not have severe symptoms. Public treatments (analgesic, antipyretic, antihistamine, fluid therapy, etc.) were implemented according to general respiratory infections (bacteria, virus). Kaletra, which was an AIDS treatment as an antiviral agent to treat the COVID-19, was also used in 686 patients at the hospital from March 2020th to April 2021th. Of course, many patients felt difficulties while taking Kaletra, and there were many

patients who stopped in the middle of treatment due to side effects such as diarrhea and GI symptom. At that time, there was an opinion that Kaletra would reduce the viral load of the COVID-19 virus at that time. But in the end, it was concluded that it was not of much help. From August 2020th, many elderly, medically ill, and worsening patients were hospitalized in Korea, and they started to receive the drugs recommended for treatment. In particular, the start of administration of the antiviral drug Veklury (Remdesivir) in our hospital was from November 2020th, and the start of administration of the monoclonal antibody Regdanvimab (Regkirona) was from February 2021th. The start of administration of steroids including dexamethasone injection was also in November 2020th. In most cases, if pneumonia was present, oxygen saturation was maintained at 95% or higher in room air, and symptoms occurred within 7 days, the monoclonal antibody Regdanvimab (Regkirona) was preferentially administered. If there is pneumonia and oxygen saturation falls below 94% in room air, we start oxygen therapy and use Veklury (Remdesivir) as an antiviral agent for 5 days with 6 vials. Dexamethasone injection 1.2 mg was also mainly used together with Veklury (Remdesivir) injection. As the pneumonia improved, oxygen saturation was restored without the need for oxygen by using antibody therapy, antiviral drugs, and antibiotics together. Oxygen was usually used for about 1-2 weeks throughout the hospitalization period. Veklury (Remdesivir) injection should be administered as early as possible after the onset of symptoms when the oxygen saturation begins to drop below 94% to prevent the progression to severe pneumonia as much as possible. It was discovered that it could serve as an important therapeutic agent. In fact, in Korea's quarantine system, it is possible to administer Regdanvimab (Regkirona) and Veklury (Remdesivir) in the early stages of an COVID-19 disease. It is considered that the mortality rate in Korea is low because it is a quarantine system that can be treated in early phase of COVID-19 disease in hospitals. [12, 13]

**Table 12.** Regdanvimab (Regkirona) Administration Status. Feb. 2021th-Sep. 2021th.

Using period	2021. Feb.	2021. Mar.	2021. April	2021. May	2021. June	2021. July	2021. August	2021. Sep.	Sum
Patients number	7	30	85	90	109	197	186	178	899

**Table 13.** Veklury (Remdesivir) administration status. Nov. 2020th-Sep. 2021th.

Using Period	2020. Nov.	2020. Dec.	2021. Jan	2021. Feb	2021. Mar	2021. April	2021. May	2021. June	2021. July	2021. Aug	2021. Sep	Sum
Patients number	7	58	16	25	13	18	24	26	74	87	76	424

**Table 14.** Discharge status of 2,925 hospitalized patients.

Period	Cured discharge	Referral to other hospitals (severe cases, special treatment, for family care)	Referral to living treatment center	Death discharge
sum	2,587	207	16	2

According to the data summarized through the chart of the 2,925 COVID-19 confirmed patients who were hospitalized from March 2020th to September 2021th, the hospitalization period of the inpatients was usually within

two to three weeks.

From March 2020th to September 2021th, among the 2,925 confirmed of COVID-19 patients were hospitalized, 2,587 were cured and discharged, 207 were transferred to

other hospitals because of severe cases need for ventilator or ECMO or for special treatment and hospitalization with family. 16 patients were discharged to the community living treatment center for more quarantine and two patients were died discharged.

## 4. Discussions

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a positive-stranded RNA virus with an envelope that is 80% or more similar in RNA sequence to bat coronavirus. The most likely theory is that it acted as an intermediary. Human-to-human transmission is assumed to be the primary route of infection, but a number of research results suggesting the possibility of airborne transmission have been published recently. It is known that infection with SARS-CoV-2 is most contagious just before the onset of symptoms and in the early stages of the disease, and the infectivity is weakened 5 days after the onset of symptoms. There is an incubation period of 1 to 2 weeks from being infected to the COVID-19 until symptoms appear, there is a lot of individual difference and 50% of infected people can be asymptomatic. It seems that the COVID-19 had no choice but to spread around the world because there are many people who are asymptomatic or have only slight cold symptoms and they didn't test for the COVID-19 and they spread the COVID-19 to others around the world. [9]

Now in Korea 50% of COVID-19 patients are asymptomatic, and about 40% suffer from mild to moderate pneumonia and generalized symptoms caused by multi-organ COVID-19 infection. And 10% of COVID-19 patients appear to progress to severe pneumonia form, systemic sepsis, thrombosis and ARDS as if anaphylaxis and hypersensitivity reaction. Elderly patients and bed-ridden patients have a high mortality rate. Usually elderly patients with various chronic diseases, disabled bed-ridden status patients, have a hard time coping with any type of pneumonia. In 2021, Regdanvimab (Regkirona) and Veklury (Remdesivir) began to be administered, and vaccines began to be administered. At the time of admission, when symptoms occurred within 7 days, pneumonia was present, and oxygen saturation was maintained at 94% or higher, Regdanvimab (Regkirona) was administered. And when the high fever started to cause pneumonia and the CRP started to rise above 3, the antibiotic Tazoperan or 3<sup>rd</sup> generation Cefalosporin was also administered for 5 days or more. [10]

Veklury (Remdesivir) was administered as soon as the oxygen saturation fell below 94%.

Usually Veklury (Remdesivir) administered mainly for 5 days and for more very severe cases Veklury (Remdesivir) can be administered for 10 days. Usually, during the 5 days of administration of Veklury (Remdesivir), the fever dropped and the oxygen demand started to gradually decrease. It was difficult to predict which of the patients would develop to severe pneumonia or not. It is certainly that it can be prevented a lot of progression to severe form of COVID-19 disease through the Regdanvimab (Regkirona), and the early

administration of the Veklury (Remdesivir). In addition, those who received the vaccine two times were not hospitalized due to COVID-19 until September 2021th. But elderly vaccine completion patients started to be hospitalized around September 2021th. Usually elderly vaccine completion patients get well easier than non-vaccine completion patients. However, from the beginning of November 2021th, the number of patients who completed the vaccine, like those who did not get the vaccine, started to progress to severe cases. From then on, our government start 3<sup>rd</sup> booster vaccine. It is still difficult to determine who will develop pneumonia severely or not. Age or pre-existing underlying diseases were not necessary factors that made pneumonia getting worse. Of course, it is true that it is difficult for elderly people to endure severe pneumonia and treatment itself, so the mortality rate increases. It is thought that the severity of pneumonia varies depending on the individual immune response, such as anaphylaxis to the COVID-19. It is not clear what the individual risk factors are, but obesity itself can be seen as a risk factor that makes the COVID-19 disease to be more severe form. One of the most important things of clinical picture during hospitalization is that the continuation of high fever itself means the progression of pneumonia. And pneumonia, which rapidly progresses in clinical features day by day, was characterized by uncontrolled and repeated continuous high fever and a rapid decrease in oxygen saturation. The important thing is that Regdanvimab (Regkirona) should administered as early as possible in the early stage of infection and Veklury (Remdesivir) also should be administered as soon as possible at the time when oxygen saturation starts to drop. It is believed that the current quarantine system in Korea, which allows patients to be treated in hospitals at the initial stage of diagnosis, lowered the death rate from COVID-19.

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