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CLINICAL GROUP

INTERNATIONAL JOURNAL OF
Clinical Endocrinology and Metabolism
OPEN ACCESS JOURNAL

ISSN: 2640-7582 DOI: https://dx.doi.org/10.17352/ijcem

Research Article

COVID-19 diseases, understanding and treatments

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Received: 03 January, 2023
Accepted: 17 January, 2023
Published: 18 January, 2023

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Keywords: Veklury; Paxlovid

Abstract

Seobuk Hospital is a hospital directly operated by the Seoul Metropolitan Government and has mainly served as a tuberculosis hospital. It is a Seoul city governmental public hospital which primarily provides inpatients and out patients treatment to the elderly, many of them suffering from dementia patients and the marginalized, such as the homeless and the disabled.

From March 2nd, 2020, to May 31th, 2022 Seobuk hospital was appointed to treat COVID-19 patients that required stationary treatment. South Korea's COVID-19 mortality rate has below 0.1% while in other countries such as the United States and in Europe the mortality rate varies between 1 and 2 %. We believe that it is due to the quarantine system which was put in place right from the start of the COVID-19 pandemic in Febuary 2020. Patients testing positive for COVID-19 were hospitalized free of charge and they were hospitalized usually in early period (2 - 3 days after COVID -19 testing) of COVID-19 disease.

In this paper we analyzed the disease patterns of patients hospitalized with COVID-19 using the data from the 4,531 patients charts which received treatment in Seobuk hospital between March 2nd, 2020 and May 31st, 2022 by looking at their clinical features and medication history and medications for treatment.

The key element of the guideline of our treatment was to administer Veklury (Remdesivir) or Paxlovid despite its high cost in the early period of the COVID-19 disease when oxygen saturation dropped below 94%. Nowadays we administer Veklury and Paxlovid right after COVID-19 is daignosed free of charge for the proper patient. It is believed that the current quarantine system in South Korea which allows patients to be treated with Veklury (Remdesivir) in hospitals at the initial stage of the infection and with an early Paxlovid administration in home treatment has contributed to lowering the death rate in South Korea.

Introduction

In the Republic of Korea, the quarantine system operates in such a way that isolation and treatment begin at a life treatment center or a hospital dedicated to COVID-19 within 1 - 2 days of a positive COVD-19 test result. From March 2nd, 2020, Sebuk Hospital started to do function as a hospital mainly for COVID-19 infections and has continuously treated COVID-19 inpatients until May 31th, 2022. In April 2021, in Korea the administratoin of COVID-19 vaccines was given priority to the elderly (including in nursing homes), the vulnerable groups (including the nursing homes for the homeless and the disabled), as well as to hospital and other government quarantine facilities staff members. Currently 80% of the population has completed the second round, and now the focus is on receiving the third and fourth vaccine. All COVID-19 related hospitals have been continuing to treat many COVID-19 patients during the last 3 years in Korea. In December, 2021, South Korea recorded about 7,000 daily confirmed cases, the number of confirmed cases in the Seoul and Gyeonggi-do region accounting for about 64% of the country's total cases. At that time 27 hospitals were in operation in Seoul, 7 of them being public hospitals in Seoul and 20 private and national hospitals dedicated to COVID-19 treatment [1-5]. According to the data of December 2nd, 2021 , 1.813 people were hospitalized in 27 hospitals, while 3,578 people were quarantined in 15 community life treatment centers operated by the city government and 20 community life treatment centers operated by the district.

Citation: Choi Y, Jin HJ, Song EH, Kim BY, Park SA (2023) COVID-19 diseases, understanding and treatments. Int J Clin Endocrinol Metab 9(1): 001-007.
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In addition, when a family hospitalization became necessary because of small children or to provide nursing care to a family member, sometimes hospital provides a family room. Home treatment, which was assigned through the consultation of epidemiological investigators and allowed COVID-19 patients to be quarantined at home according to their preference has increased significantly in Febuary 2022 because of the lack of hospital capacity. In some ways, it was a situation that could be called home quarantine treatment, waiting for hospitalization. Patients who were in community life treatment centers or home quarantine treatment, if their oxygen saturation dropped or dyspnea and other problem occured, had to be transferred to COVID-19 dedicated hospitals.

All treatment costs and living expenses at the quarantine facilities or infectious disease hospitals are fully covered by the government as long as the COVID-19 test is positive. The quarantine system in Korea has been and is still operating in such a way that isolation and treatment begin within 1-2 days of a positive COVID-19 test result, if possible at a community life treatment center or a hospital dedicated to COVID-19. However, with the prevalence of omicron COVID-19, starting in January 2022, the system of self-quarantine at home started to become more and more relevant to the situation. From that time on we started and expanded the use of the oral anti-viral agnet (Paxlovid). Omicron COVID-19 usually induces bronchitis and pleuritis. The Omicron COVID-19 virus itself usually doesn't induce lung parenchyme inflannaion (pneumonia). However, other symptoms and the inflammation of all other systems are similar with what we see in Delta COVID-19. Generally, the disease severity is decreased while the disease infectivity is more increased. Omicron COVID-19 usually cuases a severe inflammation in the upper respiratory system which can then induce upper airway restriction and asthmatic attack. There is also a risk of other superinfected bacterial pneumonia usually occuring in old aged patients wih pre-existing underlying diesease [6-10]. All these factors led to an increased oral administration of Paxlovid in home self quarantine.

Materials and methods

Seoul Metropolitan Seobuk Hospital was one of the first public hospitals to become a main hospital for COVID-19 among various national and public hospitals in Seoul in March 2020. In this paper we analyzed the disease patterns of patients hospitalized with COVID-19, looking at the chart data of 4,531 people who received hospitalization from March 2nd, 2020 to May 31st, 2022. This paper describes the various pre-existing diagnoses that COVID-19 patients had and also the various diagnoses that COVID-19 patients developed during their infection, by analyzing the data on the clinical aspects and medication history of hospitalized COVID-19 patients [10-15]. The already existing diseases and COVID-19-related clinical manifestation patterns of COVID-19 patients who were hospitalized at this hospital are summarized. This article would like to suggest an understanding of the disease manifestations of COVID-19 and also summarizing the diverse treatments and treatment results, including the medications administered to the COVID-19 patients. The COVID-19 patients include all infected by Alpha, Beta, Gamma, Delta and Omicron, BA variant. Patient status by age Table 1, gender status Table 2 and patient status according to patient's nationality Table 3 are explained in this materials and method.

Table 1: Status of inpatients by age from March 2nd, 2020 to May 31st, 2022.

Age division	Number of patients
1 – 10 yrs	220
11 – 20 yrs	216
21 – 30 yrs	356
31 – 40 yrs	464
41 – 50 yrs	543
51 – 60 yrs	672
61 – 70 yrs	1,131
71 – 80 yrs	645
81 – 90 yrs	237
91 – 100 yrs	47
Sum	4,531

Table 2: Status of inpatients by gender from March 2nd, 2020 to May 3th, 2022.

Gender	Number of patients
Male	2,318
Female	2,213
Sum	4,531

Table 3: Status of inpatients by nationality from March 2nd, 2020 to May 31th, 2022.

Nation	Number of patients
South Korea	4,369
China	95
USA	11
Russia	6
Vietnam	5
England	4
Kazakhstan	4
Thailand	3
Mongolia	2
Nephal	2
Uzbekistan	2
Bangladesh	1
China (Korean)	1
Pakistan	1
India	1
Australia	1
Saudi Arabia	1
Senegal	1
Ethiopia	1
United Arab Emirates	1
Iraq	1
Overseas Korean	1
Sum	4,531

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Results

The database and Tables for this paper is porvided by the analysis of the medical charts ot the 4,531 patients who received inpatients treatment between March 2nd, 2020 and May 31st, 2022. From Tables 4-11, the Tables are classified by disease institution with patients' underlying diseases or newly diagnosed diseases. We want to show the disease patterns of hospitalized COVID-19 patients through Tables that categorize patients' already existing diseases and newly diagnosed diagnoses at the time of their hospitalization. We also talk about how the clinical aspects of COVID-19 themselves change the accompanying underlying diseases and about how oxygen therapy has been applied.

It could have been expected that the course and the clinical manifestations of the COVID-19 disease would differ depending on the age or any underlying chronic disease, but this was not necessarily the case. Although some of the young patients had no pre-existing disease and had been in good health before, there were many cases where the course of COVID-19 progressed very quickly and severely. On the other hand, among elderly patients with many underlying chronic diseases, there

Table 4: Cardiovascular comorbidities.

Underlying or newly diagnosed disease	Numbers of patients
Hypertension and hypertensive heart disease	1,422
Hyperlipidemia	850
Coronary artery disease and complications (angina, myocardial infarction, etc.)	182
Unspecified arrhythmias (atrial fibrillation, tachycardia, bradycardia, atrioventricular block, etc.)	123
Deep vein thrombosis	114
Artificial valve and coronary artery, presence of aortic implant, aortic aneurysm, etc.	78
Other heart failure (pulmonary edema, pericardial effusion)	28

Table 5: Respiratory comorbidities.

underlying or newly diagnosed diseases	Number of patients
Asthma, unspecified	116
Respiratory infection sequelae and tuberculosis sequelae	96
Chronic obstructive pulmonary disease and emphysema bronchitis	57
Atelectasis	34
Pulmonary nodule, pulmonary embolism	23
bronchiectasis with bronchiectasis, bronchial stenosis	22
Interstitial lung disease	11

Table 6: Endocrine comorbidities.

underlying or newly diagnosed diseases	Number of patients
Diabetes mellitus with unspecified complications	794
Thyroid postoperative status, thyroiditis, hypothyroidism	117
Hyperthyroidism, Graves' disease	20

Table 7: Kidney and urinary system comorbidities.

underlying or newly diagnosed diseases	Numbers of patients
Prostatic hypertrophy and prostatitis	110
Persistent proteinuria, unspecified renal failure	47
Urinary tract infection, stones, and hematuria	27
Electrolyte abnormalities (hyperkalemia, hypokalemia)	6
kidney transplant status	5

Table 8: Chronic Inflammatory automiiune Diseases and Allergic Diseases.

underlying or newly diagnosed diseases	Number of patients
Unspecified skin allergy, rash, drug, environment	92
Chronic allergic rhinitis	28
Rheumatic disease	15
Psoriasis	11
Herpes zoster	7
late syphilis	7
Behcet's disease, ulcerative proctitis	4
Ankylosing spondylitis	2
systemic lupus erythematosus	2
Celiac disease	1

Table 9: Chronic Hematological Tumor Diseases.

underlying or newly diagnosed diseases	Number of patients
Breast cancer, postoperative status	43
Thyroid malignant neoplasia postoperative status	38
Unspecified iron deficiency anemia, nutrient deficiency anemia	34
Colon and rectal malignant neoplasms postoperative status	28
Postoperative status of malignant neoplasm of the prostate	14
Chronic myelogenous leukemia, hematologic cancer, MDS, multiple myeloma, etc.	9
Gastric cancer postoperative status	8
Kidney cancer postoperative status	6
Postoperative condition for cervical cancer	6
Lung cancer (small cell Ca etc)	5
Postoperative status for head and neck cancer, Postoperative status for brain tumor	4
Gallbladder Cancer Postoperative Condition	4
Tonsil cancer postoperative condition	2
Secondary Thrombocytopenia	2

Table 10: Chronic digestive system diseases.

underlying or newly diagnosed diseases	Number of patients
Elevated Liver Function Levels and Toxic Hepatitis	221
Chronic hepatitis B and C	156
Gastric ulcer, drug-induced gastroenteritis and colitis, esophageal reflux, esophagitis	129
Acute and chronic pancreatitis	14
Liver cirrhosis, biliary cirrhosis	13
Cholelithiasis, condition after gallbladder removal. cholecystitis	10
Chronic Constipation	10
After peritonitis surgery, after hernia surgery, after appendix surgery, after colostomy	6

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Table 11: Chronic neuropsychiatric diseases and disorders.

underlying or newly diagnosed diseases	Number of patients
Schizophrenia, bipolar disorder, anxiety disorder, panic disorder	99
Cerebral blood vessels, cerebral infarction, cerebral lesions due to trauma, cerebral aneurysm	83
Alzheimer's dementia and Parkinson's dementia	44
Sleep Disorders	40
Epilepsy, encephalopathy, including epilepsy. cerebral palsy	15
physical disability	8
Intellectual disability	7
Autism Disorder	6
Visual diability	6
Developmental diability	5
obsessive compulsive disorder	2

were many cases where they overcame COVID-19 without any major problems. In this paper, by analysis of the charts of the 4,531 patients who received inpatients treatment from March 2nd 2020 to May 31th 2022, we look at the clinical features of the COVID-19 patients. By summarizing the treatments and treatment results, including the medications, we would like to share and suggest ways to understand and cope with COVID-19.

An infection with the COVID-19 virus usually causes a rise in the blood pressure and and increased thrombus formation during the hospitalization period. These manifestation continue for several weeks. We also observed an increased frequency of overall cardiovascular diseases, requiring ongoing additional medication, in most cases even after discharge while the hypertension medication could be stopped after 1-2 months in many cases. Hypertension and hyperlipidemia were the two most common cardiovascuar diseases diagnosed during COVID-19. Patients who already have had these diseases needed more medication for coronary artery disease and arrhythmias. During the infection with COVID -19 atherosclerotic changes occur in the blood vessels. After the patient recovers from COVID-19 the underlying cardiovascular manifestation start to slowly get better to return to their initial status.

We found that respiratory diseases such as chronic obstructive pulmonary disease, emphysema, tuberculosis sequalae, asthma, and bronchiectasis were common as accompanying underlying diseases. For all patients hospitalized for COVID-19, chest CT scans check the course of the disease, allowing for an underlying lung disease to be detected. After 5 days - 7 days of COVID-19 infection, due to changes in the personal immune system, the normal bacteria in the oropharyngeal area might increase in infectivity as like opportunity infection and other viral pneumonia and bacterial pneumonia caused by changing immunity during COVID-19 infection. Therefore, the administration of antibiotics were often necessary. The cultures of sputum spit of patients at the time of admission, most commonly detected the Pseudomonas strain which is usually sensitive to tazoperan and third-generation cephalosporins. Although the degree of pneumonia varies from person to person, from within 10% of the lung volume to more than 60% - 70% of severe pneumonia, it usually improves during 2 - 3 weeks of hospitalization under antibiotics and general supportive care. Changes in the lung can be confirmed through low dose CT. Even if the pneumonia improved, sequalae as like fibrosis could remain in some cases.

Diabetes mellitus was the most common endocrine disease found as an accompanying underlying disease. Many patients were hospitalized and diagnosed with diabetes and in many cases blood sugar levels temporarily rose as like impaired glucose tolerance. COVID -19 disease itself tends to raise blood sugar overall. This is also caused by the extreme stressful situation in which diabetes is easily developed along with the continuous stimulation of the sympathetic nervous system. COVID-19 disease itself is very stressful situation, causing dehydration through very high fever.Another factore contributing to increased blood sugar levels is poor oral intake during COVID-19 and the treatment by dexamethasone during the treatment of COVID-19 disease. Follow up is needed after getting over the COVID-19 disease.

As an accompanying underlying disease, there were quite a few patients with chronic kidney failure who continued to take medication and control their diet . Our hospital cannot perform dialysis treatment but accepts patients before dialysis or after transplantation. COVID-19 causes a lot of problems with persistent high fever, difficulty in eating and severe dehydration. During the epidemic period of COVID-19, there were many cases of dehydration, acute renal failure and electrolyte abnormalities. As a very come problem dehydration can induce acute renal failutre. Therefor, dehydration correction is very important treatment in the early phase of the COVID-19 disease.

We found chronic infectious diseases and autoimmune diseases as accompanying underlying diseases, such as late syphilis, psoriasis, Behcet's disease, ulcerative proctitis, systemic lupus erythematosus, and ankylosing spondylitis and others in patients who had stable conditions under chronic and long-term treatment. Some of these cases were pre-existing conditions before COVID-19 but we observed skin lashes which newly developed during hospitalization due to COVID-19 itself. It is difficult to predict whether a patient with underlying chronic autoimmune diseases or chronic allergic diseases would develop a more severe generalized skin lashes or COVID-19 related pneumonia or not. This seems to be determined by the patient's individual immunity, allergy status and anaphylaxis reactions. It is well possible that regardless of underlying diseases, severe pneumonia and generalized hyper-reaction to COVID-19 is due to sensitive reactions such as anaphylaxis against new virus.

We counted chronic cancer as a comorbid underlying disease in patients who had completed surgery and chemotherapy within the last 5 years and were only following up. However, in some cases, chronic myeloid leukemia patients temporarily stopped their leukemia treatment procedures and drugs and received public treatment related to the COVID-19 disease. In many cases blood test results, due to the amplification of the COVID-19 virus in the body, display a slightly similar reading as a leukemia or sepsis. Prolonged high fever and a severe inflammatory reaction caused a decrease in the platelet

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and neutrophil count in a significant number of patients. Symptoms and laboratory findings generally normalized again 3 days - 4 days after recovering from COVID-19 with or without other specific treatment

It can be seen that the most common diagnosis during hospitalization of confirmed COVID-19 patients is an elevated liver function due to liver inflammation, i.e. toxic hepatitis due to COVID-19 itself. In severe cases, the elevation increased to more than 10 times the normal level. However, with COVID-19 treatment, including an antiviral agent and monoclonal antibody, over a 2 - 3 weeks period. liver function test results gradually normalized again. Most of the patients had normal liver function tests before admission. Even the patients with existing chronic diseases such as hepatitis B, hepatitis C and cirrhosis had well maintained liver function level by taking antiviral drugs prior to the onset of COVID-19.

During the hospitalization period, the most commonly observed digestive symptoms were diarrhea, nausea, vomiting and poor oral intake. In case of very severe diarrhea, Loperamide was used to usually bring some improvement with the almagate agent. With the recovery from the COVID-19 disease, digestive organ-related symptoms improved. The loss of the ability to smell and taste , as well as nausea and vomiting are usually correlated to dehydration and liver inflammation and other gastrointestinal inflammation .

Pre-existing cerebrovascular and psychiatric diseases as comorbid underlying diseases were long-term chronic diseases and necessitated for patients to be hospitalized with the caregiver or family member. There were difficulties in communication and in keeping the patients in isolation due to psychiatric or physical handicap but we did not think that the existing underlying diseases had a lot of influence on the clinical picture and severity of the COVID disease itself.

Discussions about treatments

In South Korea, as soon as COVID-19 patients were diagnosed through a COVID-19 test, they were either given inpatient treatment at an infectious disease hospital or quarantine treatment at a life treatment center or in their own home through separation from the rest of the household. All treatment costs and living expenses in both hospital and quarantine life treatment center are fully covered by the government as long as the COVID-19 test is positive. This approach is different from other countries, including the United States, where infected people only receive treatment when the disease has become severe and oxygen therapy or ventilator is necessary.

Public supports and anti-viral agents and immune modulators (monoclonal antibody)

Public treatments (analgesic, antipyretic, antihistamine, fluid therapy, etc.) were implemented according to general respiratory infections (bacteria, virus). Kaletra, an antiviral agent used in AIDS treatment, was used in our hospital on 686 patients between March 2020 and April 2021. The heavy side effects (diarrhea and GI symptoms) triggerd by Kaletra caused many patients to discontinue this treatment. At that time, we believed that Kaletra would reduce the the COVID-19 virus load however we came to the conclusion that it was not of much help.

From August 2020 many elderly medically ill, in a worsening condition , started to get hospitalized in Korea. They started to receive the drugs recommended for treatment. Our hospital started to administer the antiviral drug Veklury(Remdesivir) in November 2020, and the monoclonal antibody Regdanvimab (Regkirona) in February 2021. We had already started to give steroids, including dexamethasone injections, in August 2020. In cases of pneumonia , with oxygen saturation at 95% or higher in room air, the preferential treatment was the monoclonal antibody Regdanvimab (Regkirona) when symptoms occurred within 7 days. In cases of pneumonia with oxygen saturation below 94% in room air, we start oxygen therapy and use Veklury (Remdesivir) as an antiviral agent for 6 vials over 5 days. Dexamethasone injection 1.2 mg is also given in conjunction with Veklury (Remdesivir) injection. The combined use of antibiotics and antiviral agents brings an improvement of the pneumonia and restore the oxygen saturation without needing more oxygen. We usually use oxygen for about 1-2 weeks throughout the hospitalization period. Veklury (Remdesivir) injections should be administered as early as possible after the onset of symptoms when the oxygen saturation begins to drop below 94% in order to prevent the progression to a severe pneumonia. We found antiviral agent to serve as an important therapeutic agent. In Korea's quarantine system and treatment protocol, it is possible to administer Regdanvimab (Regkirona) and Veklury (Remdesivir) in the early stages of the COVID-19 disease in hospital treatment which is one of the reasons to explain Korea's low mortality rate (Tables 12-17).

Table 12: Regdanvimab (Regkirona) (in administration Status. Feb 2021 – Dec 31st, 2021.

Period of use	Number patients
February 2021-December 31st, 2021	1,248

Table 13: Veklury (Remdesivir) in administration status Nov. 2020- May 31st, 2022.

Period of use	Number patients
November 2020- May 31st, 2022	970

Table 14: Paxlovid use in administration status Feb. 2022-May 31st, 2022.

Period of use	Number of patients
February 2022- May 31st, 2022	109

Table 15: Cnoxane injection in administration status Feb. 2021-May 31st, 2022.

Period of use	Number of patients
February 2021- May 31st, 2022	155

Table 16: Olumiant use in administration status Feb 2021-May 31st, 2022.

Period of use	Number of patients
February 2021- May 31st, 2022	109

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Table 17: Steroid use in administration status March 2020 - May 31st, 2022.

Period of use	Methyl PD IV& Dexamethasone IV	Dexamethasone oral & PD oral agent
March 2020-May 31st, 2022	1151	499

Oxygen therapy (low dose and high dose therapy)

We would like to talk about oxygen therapy for COVID-19 patients. Patients who were admitted to our hospital were given an oximeter to check and record their saturation several times in a day. When the oxygen saturation in room air dropped below 94% , wer swiftly started oxygen therapy. We sometimes used oxygen intermittently for chest tightness without dropping of saturation monitor. We aimed at maintaining oxygen saturation above 94% by giving 1 L/min -7 L/min oxygen through a nasal cannula or a reservoir mask. With the improvement of the pneumonia improves, oxygen is tapered and stopped at the time of discharge. In order to be discharged without oxygen, the patient's saturation in room air without oxygen had to be above 95% for more than one day.

In case oxygen saturation cannot be maintained over 95%, by using a reservoir mask of 7 L/min due to a high oxygen demand, we use a high flow O2 supply machine. This machine has a nasal cannula and allows for more powerful oxygen supply as like ventilator and is indicated when the patient is mentally alert and able to eat orally. The clinical manifestations of the COVID-19 disease usually change rapidly thanks to the anti-viral agent and anti-inflammatory drugs and mostly improve within 2-3weeks.

We usually start using the high flow machine at FiO2 0.5 and flow 50 and can increase FiO2 and flow level. As the pneumonia improves thanks to its proper timing anti-viral and anti-inflammatory treatment, we change to nasal O2 and then slowly tapering possible with nasal O2 and the patient is able to be discharged without oxygen within 2 - 3 weeks. In the cases where there is no improvement despite the continual increase of FiO2 and treatment of the pneumonia, we have to refer the patients to a university hospital where patients can be intubated and the use of ventilator and ECMO is possible (Table 18).

Table 18: Discharge status of 4,531 hospitalized patients.

Period	Total admission Number	Referral to other hospitals (severe cases, special treatment)	Referral to living treatment center, Referral to other hospital (for family care)	Death discharge
March 2nd, 2020-May 31st, 2022	4,531	297	27	29

Treatment result analysis and discussion

The duration of hospitalization of our inpatients was usually between two and three weeks. From March 2nd, 2020 to May 31st, 2022, from the 4,531 confirmed COVID-19 hospitalized patients 4,178 were cured and discharged, 297 were transferred to other hospitals because their severe cases required a ventilator, ECMO or other special treatments. 27 patients were discharged to the community life treatment center or other hospitals for more quarantine while 29 patients died.

Final conclusions about COVID-19 by clinical experience

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. 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 SARSCov-2 is most contagious just before the onset of symptoms and in the early stages of the disease and that 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 are a lot of individual differences and 50% of infected people can be asymptomatic. It seems that the COVID-19 virus had no choice but to spread around the world through of the many asymptomatic people or those who only have slight cold symptoms and thus did not test for COVID-19. In Korea 50% of COVID-19 patients were asymptomatic while about 40% of patients suffer from mild to moderate pneumonia and generalized symptoms caused by multi-organ COVID-19 infection. In nearly 10% of the COVID-19 cases, patients progress to severe pneumonia form, systemic sepsis, thrombosis and ARDS as if anaphylaxis and hypersensitivity reaction. Of course elderly and bedridden patients have a high mortality rate. In any given case, elderly patients with various chronic diseases and disabled, bedridden patients have a hard time to cope with any type of pneumonia.

In summary, the treatment we administer in Korea has been as follow:

From late 2020 we began to administer Veklury (Remdesivir).

From Febuary 2021 we began to administer Regdanvimab (Regkirona).

From April in 2021 the vaccination campaign started, giving priority to the elderly and to vulnerable groups.

The Korean quarantine system, based on the principle of isolation and treatment was implemented at either a life treatment center or a hospital dedicated to COVID-19 within 1 - 2 days after a positive COVID-19 test result.

Hospitalized patients who developed symptoms and presented pneumonia within 7 days, and whose oxygen saturation was maintained at 94% or higher, were given Regdanvimab (Regkirona). Veklury (Remdesivir) was administered as soon as the oxygen saturation fell below 94%. As a rule Veklury (Remdesivir) is administerd for 5days but in more very severe cases it can be administered for 10days. From 2022, the Veklury infusion guidelines changed and Veklury could be administered for three days even in case of no drop in oxygen saturation. In case of high fever and a CRP above 5, a five day of the antibiotic Tazoperan or 3rd generation Cefalosporin

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was added to the treatment. Usually, the fever subsides and the oxygen demand gradually decreases within these 5days with proper treatments.

Though it is difficult to predict who will develop a severe pneumonia and who would not. It is certain that a severe form of COVID-19 disease can be prevented through the early administartion of Regdanvimab (Regkirona) and Veklury (Remdesivir).

In April 2021 the elderly and the vulnerable groups were given priority to receive the COVID-19 vaccine. Until September 2021 it was unusual for people having received two doses of the vaccine to be hospitalized for COVID-19. This situation was changed after September 2021 when more and more elderly patients with completed vaccines started to be hospitalized. But we could see them recovering faster than those who had not been vaccinated. However, from the beginning of November 2021, both the vaccinated and unvaccinated started to develop to severe forms of COVID-19 cases.

From then on, our government started to offer the booster shot. It still remain difficult to determine who will develop a severe pneumonia and who won't. Age or pre-existing underlying diseases are not necessary factors that cause a pneumonia to worsen. It is obviously true that it is difficult for elderly people with complex diseased to go through a severe combined bacterial pneumonia and its treatment, so the mortality rate is higher in this old age group. It is assumed that the severity of pneumonia varies according to individual immune response with the worst case of anaphylaxis to the COVID-19. It is not clear what the individual risk factors are, but obesity usually certainly seems to make the COVID-19 disease progress to more severe forms.

One of the most important components of the clinical picture during hospitalization is that continuous uncontrolled high fever also indicate the progression of pneumonia which a rapid decrease in oxygen saturation. It is therefore crucial for Regdanvimab (Regkirona) to be administered as early as possible in the early stage of infection and Veklury (Remdesivir) also early administration is important as soon as possible once oxygen saturation starts to drop below 94 %. But Regdanvimab (Regkirona) could not effect of blocking viral cell penestration against after Omicron mutant COVID-19 stains. And then after Omicron variant , we didn't use Regdanvimab (Regkirona).

We believe that the current Korean quarantine system to take COVID-19 patients to hospital at an early period of the disease, as well as the free hospital treatment for all patients in the initial stage of the infection and the administration of Regdanvimab (Regkirona) and Veklury (Remdesivir) and Paxlovid have been instrumental to keep the death rate for COVID-19 low in Korea.

References

1. Lisco G, De Tullio A, Stragapede A, Solimando AG, Albanese F, Capobianco M, Giagulli VA, Guastamacchia E, De Pergola G, Vacca A, Racanelli V, Triggiani V. COVID-19 and the Endocrine System: A Comprehensive Review on the Theme. J Clin Med. 2021 Jun 29;10(13):2920. doi: 10.3390/jcm10132920. PMID: 34209964; PMCID: PMC8269331.
2. Ghasemi M, Umeton RP, Keyhanian K, Mohit B, Rahimian N, Eshaghhosseiny N, Davoudi V. SARS-CoV-2 and Acute Cerebrovascular Events: An Overview. J Clin Med. 2021 Jul 29;10(15):3349. doi: 10.3390/jcm10153349. PMID: 34362133; PMCID: PMC8348889.
3. Cut TG, Tudoran C, Lazureanu VE, Marinescu AR, Dumache R, Tudoran M. Spontaneous Pneumomediastinum, Pneumothorax, Pneumopericardium and Subcutaneous Emphysema-Not So Uncommon Complications in Patients with COVID-19 Pulmonary Infection-A Series of Cases. J Clin Med. 2021 Mar 24;10(7):1346. doi: 10.3390/jcm10071346. PMID: 33805118; PMCID: PMC8036962.
4. Wu CC, Lee AJ, Su CH, Huang CY, Islam MM, Weng YC. Statin Use Is Associated with a Decreased Risk of Mortality among Patients with COVID-19. J Clin Med. 2021 Apr 1;10(7):1450. doi: 10.3390/jcm10071450. PMID: 33916281; PMCID: PMC8036545.
5. Rank A, Tzortzini A, Kling E, Schmid C, Claus R, Löll E, Burger R, Römmele C, Dhillon C, Müller K, Girl P, Hoffmann R, Grützner S, Dennehy KM. One Year after Mild COVID-19: The Majority of Patients Maintain Specific Immunity, But One in Four Still Suffer from Long-Term Symptoms. J Clin Med. 2021 Jul 27;10(15):3305. doi: 10.3390/jcm10153305. PMID: 34362088; PMCID: PMC8347559.
6. Posteraro B, De Angelis G, Menchinelli G, D'Inzeo T, Fiori B, De Maio F, Cortazzo V, Sanguinetti M, Spanu T. Risk Factors for Mortality in Adult COVID-19 Patients Who Develop Bloodstream Infections Mostly Caused by Antimicrobial-Resistant Organisms: Analysis at a Large Teaching Hospital in Italy. J Clin Med. 2021 Apr 17;10(8):1752. doi: 10.3390/jcm10081752. PMID: 33920701; PMCID: PMC8073579.
7. Atzeni F, Masala IF, Rodríguez-Carrio J, Ríos-Garcés R, Gerratana E, La Corte L, Giallanza M, Nucera V, Riva A, Espinosa G, Cervera R. The Rheumatology Drugs for COVID-19 Management: Which and When? J Clin Med. 2021 Feb 16;10(4):783. doi: 10.3390/jcm10040783. PMID: 33669218; PMCID: PMC7919806.
8. Ghasemi M, Umeton RP, Keyhanian K, Mohit B, Rahimian N, Eshaghhosseiny N, Davoudi V. SARS-CoV-2 and Acute Cerebrovascular Events: An Overview. J Clin Med. 2021 Jul 29;10(15):3349. doi: 10.3390/jcm10153349. PMID: 34362133; PMCID: PMC8348889.
9. Song JY, Yoon JG, Seo YB, Lee J, Eom JS, Lee JS, Choi WS, Lee EY, Choi YA, Hyun HJ, Seong H, Noh JY, Cheong HJ, Kim WJ. Ciclesonide Inhaler Treatment for Mild-to-Moderate COVID-19: A Randomized, Open-Label, Phase 2 Trial. J Clin Med. 2021 Aug 12;10(16):3545. doi: 10.3390/jcm10163545. PMID: 34441840; PMCID: PMC8396813.
10. National medical center/ Office for the central infectious disease hospital. South Korea. 2020.
11. Atzeni F, Masala IF, Rodríguez-Carrio J, Ríos-Garcés R, Gerratana E, La Corte L, Giallanza M, Nucera V, Riva A, Espinosa G, Cervera R. The Rheumatology Drugs for COVID-19 Management: Which and When? J Clin Med. 2021 Feb 16;10(4):783. doi: 10.3390/jcm10040783. PMID: 33669218; PMCID: PMC7919806.
12. Gudowska-Sawczuk M, Mroczko B. The Role of Neuropilin-1 (NRP-1) in SARS-CoV-2 Infection: Review. J Clin Med. 2021 Jun 24;10(13):2772. doi: 10.3390/jcm10132772. PMID: 34202613; PMCID: PMC8267897.
13. Islam MM, Poly TN, Alsinglawi B, Lin MC, Hsu MH, Li YJ. A State-of-the-Art Survey on Artificial Intelligence to Fight COVID-19. J Clin Med. 2021 May 2;10(9):1961. doi: 10.3390/jcm10091961. PMID: 34063302; PMCID: PMC8124542.
14. Derakhshani A, Hemmat N, Asadzadeh Z, Ghaseminia M, Shadbad MA, Jadideslam G, Silvestris N, Racanelli V, Baradaran B. Arginase 1 (*Arg1*) as an Up-Regulated Gene in COVID-19 Patients: A Promising Marker in COVID-19 Immunopathy. J Clin Med. 2021 Mar 4;10(5):1051. doi: 10.3390/jcm10051051. PMID: 33806290; PMCID: PMC7961773.
15. The importance of Early Treatment for COVID-19. American Journal of Biomedical Science & Research. 2021-14(4).

Citation: Choi Y, Jin HJ, Song EH, Kim BY, Park SA (2023) COVID-19 diseases, understanding and treatments. Int J Clin Endocrinol Metab 9(1): 001-007.
DOI: https://dx.doi.org/10.17352/ijcem.000056