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REVIEW ARTICLE

Antiviral drugs and plasma therapy used for Covid-19 treatment: a nationwide Turkish algorithm

Hayrunnisa Nadaroglu[a,b]

[a]Department of Food Technology, Ataturk University, Vocational College of Technical Sciences, Erzurum, Turkey; [b]Department of Nano-Science and Nano-Engineering, Ataturk University, Institute of Science, Erzurum, Turkey

ABSTRACT

The Coronavirus outbreak described as COVID-19 is an insidious and enormous biohazard which began to be noticed in November 2019. When the virus was determined to cause serious upper respiratory tract infections resulting in death, pandemics were declared in the world. As of today, the number of cases exceeded 221 thousand people in Turkey, the number of patients who died had reached 5526. In more than 200 countries around the world, 15.1 million people fight the disease, while the number of people recovered is over 9.134 million, and the number of deaths has exceeded 620 thousand. The top 5 countries in the world are USA, Brazil, Russia, India and Spain. The countries with the highest number of cases after America (approximately 4 million 28 thousand) are Brazil (approximately 2 million 166 thousand), India (about 1 million 195 thousand), Russia (approximately 789 thousand), South Africa (approximately 382 thousand). In addition, the number of deaths and cases caused by Covid 19 continues to increase day by day. In this review, it was aimed to discuss that Covidien-19 against antiviral drugs used in the struggle across the globe and plasma treatment options about the current state of knowledge and Turkey algorithm by comparing the therapeutic treatment options.

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COVID-19; Antiviral drugs; plasma treatment; Turkey algorithm

Introduction

Coronaviruses (CoV) are a large family of viruses which can cause serious infection manifestations, such as the Middle East Respiratory Syndrome (Middle East Respiratory Syndrome, MERS) and Severe Acute Respiratory Syndrome (Severe Acute Respiratory Syndrome, SARS), from mild infections which appear to be overcome by community members in everyday life without observing any major signs (Lee 2015; Lippi and Plebani 2020).

The Coronaviridae family includes four genera, Alpha-coronavirus (alphaCoV), Beta-coronavirus (betaCoV), Delta-coronavirus (deltaCoV) and Gamma-coronavirus (gammaCoV). Coronaviruses belong to the Coronaviridae family (order Nidovirales). It contains viruses with a single chain size of approximately 26–32 kilobases, a positive RNA genome (Weiss and Navas-Martin 2005).

It has been determined that COVID-19 virus has subtypes such as HCoV-229E, HCoV-OC43, HCoV-NL63 and HKU1-CoV, and all of them have been found to be highly contagious among humans. Since viruses have a genetic structure which is prone to mutation, their lethal activity further increases the risk of existing COVID-19. It has been proved that SARS-CoV and MERS-CoV are transmitted from person to person and even from some animals to some people (Lippi and Plebani 2020).

SARS-CoV emerged in 2003 and sadly caused hundreds of people to die worldwide. About 10 years later, MERS-CoV, which was determined to belong to the Coronavirus family, was first identified at a hospital in Zarqa, Jordan, and later in Saudi Arabia. On December 31, 2019, the World Health Organization (WHO) China Country Office reported pneumonia cases of unknown etiology in Wuhan, China's Hubei province. On January 7, 2020, the causative agent was identified as a new coronavirus (2019-nCoV) which has not previously been detected in humans and was found to belong to the Coronaviridae family. When sequence analysis of the coronovirus was performed, it was found to show 89% nucleotide similarity with bat SARS-like CoVZXC21 and 82% with human SARS-CoV (Chan et al. 2020). Later, the name of the 2019-nCoV disease was accepted as COVID-19, and the virus was named as SARS-CoV-2

CONTACT Hayrunnisa Nadaroglu hnisa25@atauni.edu.tr Ataturk University, Vocational College of Technical Science, Department of Food Technology, Erzurum 25240, Turkey

because of its close resemblance to SARS CoV. This has led to controversy as to whether COVID 19 is a virus which has been produced in the laboratory and has spreat to the world.

The source of AlphaCoV and betaCoV are thought to be bats and rodents. In some studies, there are studies related to disease symptoms caused by infectious bronchitis virus [IBV) caused by deltacoronavirus in some poultry, such as pigs and turkeys (Ma et al. 2015; Cavanagh 2005). It has been determined that the identified human coronavirus species (HCoV-OC43; beta CoV) comes from the same major ancestor as the bovine coronavirus, dog respiratory coronavirus, camel coronavirus and demonstrates significant host flexibility (Lu et al. 2017; Kin et al. 2016).

In some studies, it is stated that SARS-CoV-2 is very likely to be transmitted from animal to human, considering that it is transmitted from the animal market in China. In addition, it has been reported that the virus can cause human to human transmission by direct or indirect contact of airborne droplets and splashes caused by disease symptoms such as coughing and sneezing (Li et al. 2020).

It has been determined that 2019-nCoV is sensitive to ultraviolet light, heat, disinfectants containing 70% alcohol and chlorine, hydrogen peroxide (H_2O_2), similar to other CoV types, and preventing the spread of coronavirus, disinfection and removal of the virüs (Abd El-Aziz and Stockand 2020).

As of now, there is no drug developed for 2019-nCoV treatment that has been proven to be 100% effective. However, since the symptoms of the COVID-19 virus started to appear in China, the first treatments proceeded by using the treatment experiences applied by China. However, different treatments were used in the antiviral drugs used due to the differences in the genetic and immunological structures in the countries, and different treatments were followed by the change in the usage stages. Oxygen therapy is the most basic treatment in the treatment of patients with Covid-19 positive severe infection.

One of the drug targeting applied in the treatment of coronaviruses is the targeting of viral proteases. Mpro or 3CLpro has been named as the main protease of SARS-CoV-2 virus. Inhibiting the activity of the protease enzyme will stop the replication of the virus and provide treatment for the disease. Since a protease enzyme activity with similar activity in the human metabolic structure and functions is unknown, the inhibitors to be used cannot be toxic (Anand et al. 2003; Hilgenfeld 2014).

Favipiravir is an antiviral drug approved for common flu treatment in Japan and now approved to treat COVID-19 symptoms in China. Zhang Xinmin, head of the China National Biotechnology Development Center, said that in clinical trials, Favipiravir was able to reduce recovery time from 11 days to 4 days for mild cases. Clinical trials in China have demonstrated that a drug called 'Favipiravir' is effective in the fight against the new type of coronavirus Covid-19). In addition, chloroquine and hydroxychloroquine, used in the treatment of malaria and arthritis, have been proposed by the People's Republic of China National Health Commission for the treatment of COVID-19.

In order to develop vaccines, vaccination centers all over the world are working rapidly, but it is thought that clinical studies will be initiated by the end of 2020. Currently, the virus is isolated in almost every country and an attempt is being made to develop a vaccine against COVID-19.

In this review, COVID-19 summarizes the current state of knowledge around the world and COVID-19 for Turkey in the worldwide fight against the pandemic algorithm implemented in Turkey in terms of comparing the applied therapeutics aimed to discuss treatment options.

Antiviral drug treatment

In general, the use of antiviral drugs against viral diseases (MERS, SARS, Ebola etx.) And against SARS-CoV-2 and their mechanism of action are listed below.

Favipiravir

Favipiravir (T-705; 6-fluoro-3-hydroxy-2-pyrazinecarboxamide) is a new type of RNA-bound RNA polymerase (RdRp) inhibitör (Figure 1). Favipiravir drug was used in treatment when SARS-CoV-2 symptoms started to appear in China and clinical trials are continuing all over the world. It is defended that the mechanism of action of Favipiravir's drug is associated with the selective inhibition of the RNA polymerase enzyme that is bound to viral RNA in the body without inhibiting the RNA or DNA synthesis present in mammalian cells. Some studies have suggested that favipiravir drug induces deadly RNA transversion mutations by producing a non-lethal viral phenotype. Favipiravir drug is taken into the body either orally or intravenously and

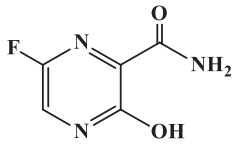

Figure 1. Chemical structure of Favipiravir drug.

metabolized to favipiravir-ribofuranozil-5il-triphosphate (favipiravir-RTP). Is Favipirav; it transforms into an active form by phosphorylation in cells and binds as the substrate of the viral RNA polymerase enzyme and inhibits the RNA Polymerase enzyme. It has been used against SARS disease before and it has been found to have a strong effect. For this reason, it is thought that Favipiravir drug will have a strong effect against SARS-CoV-2. Favipiravir showed synergistic effect when used alone or in combination with other viral drugs, showing that it has a stronger antiviral effect against SARS-CoV-2. Another most important feature is that there is no significant adverse reaction in the SARS-CoV-2 positive patient group treated with Favipiravir. In addition, it has been determined that it has significantly less side effects than the antiviral drug group (such as lopinavir + ritonavir combination) (Kiso et al. 2010; Baranovich et al. 2013; Watanabe et al. 2013).

There are very few studies on the use of Favipiravir in the clinic against coronavirus infection. In a study conducted in China during the SARS-CoV-2 pandemic; The effects of favipiravir and lopinavir/ritonavir drugs used in the treatment of COVID 19 treatment in 80 patients were compared. One of the findings obtained from the study is that Favipiravir drug is more effective. However, in another study conducted in Japan, it was reported that favipiravir drug was tried on 70–80 patients and did not provide benefit (Westover et al. 2016; Japanese flu drug 2020). These two results must be repeated with a new study.

Hydroxychloroquine and chloroquine

Chloroquine (CQ) was first used for malaria treatment and prophylactic purposes. Hydroxychloroquine (HCQ) is the metabolite of Chloroquine (Figure 2) and because it is less toxic, it causes less side effects in treatment (Sahraei et al. 2020). CQ and HCQ drugs have been used in HIV treatment and have been found to limit the virüs (Chauhan and Tikoo 2015). In the light of the findings, it was thought that it could be used in the treatment of the disease caused by the 2019-CoV virus and positive results were obtained in some studies (Sahraei et al. 2020).

A number of action mechanisms have been proposed for the action of CQ and HCQ drugs against SARS-CoV-2

The virus is thought to enter the cell by binding to Angiotensin-converting enzyme 2 or ACE2, which is an enzyme attached to the outer surface (cell membrane) of the cells in the lungs, arteries, heart, kidneys and intestines. ACE2 accelerates the hydrolysis of angiotensin II hormone, which is a vasoconstrictor, and reduces blood pressure. It is predicted that the SARS-CoV-2 virus enters the cells by binding to ACE2 located on the cell surface with the same mechanism and regulates the activation of ACE2 due to the infection of the virüs (Mauthe et al. 2018; Wang et al. 2020) CQ and HCQ are thought to prevent the entry of the SARS-CoV-2 virus into the cell by preventing the formation of glycoprotein in the structure of the ACE2 enzyme. Savarino et al. (2003) argued that CQ may inhibit the production of pro-inflammatory cytokines such as interleukin-6, thereby preventing the subsequent acute respiratory syndrome. In another hypothesis is that viruses enter the host cells through endocytosis when the virus combines with the acidic intracellular lysosome and this effect causes the release of viral content as a result of the rupture of the endosome. To prevent this situation, CQ drug has been determined to accumulate and it is believed that CQ/HCQ increases the pH level and interferes with the entry and exit of the virus into the cell (Vincent et al. 2005). These drugs have been included in COVID-19 treatment guidelines worldwide, when they reported that they thought that CQ or HCQ medications were first associated with a decrease in SARS-CoV-2 virus and a reduction in symptoms duration (Yazdany and Kim 2020).

Some side effects related to the occurrence of gastrointestinal disturbances, cardiomyopathy and heart rhythm disorders have been reported in relation to the use of both CQ and HCQ. It is recommended that these drugs should be metabolized in the liver after being taken into the body and carefully prescribed in people with liver and kidney failure due to their renal excretion (Costedoat-Chalumeau et al. 2007; Rismanbaf and Zarei 2020). The FDA is worried about the use of

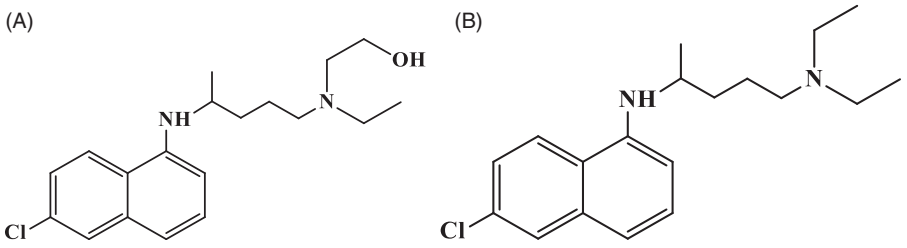

Figure 2. Chemical structure of Hydroxychloroquine (A) and Chloroquine (B) drugs.

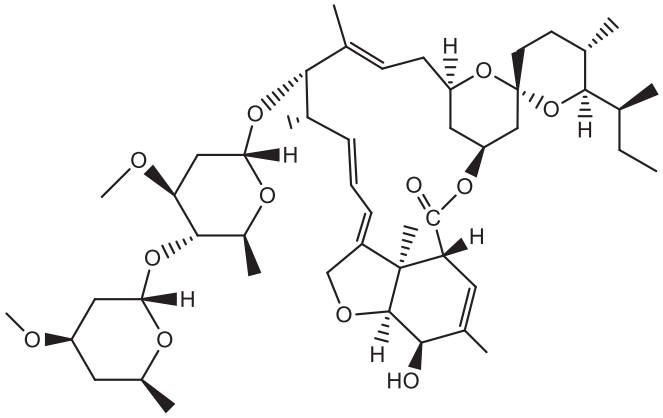

Figure 3. Chemical structure of Ivermectin drug.

HCQ and CQ medicines that are not treated in a hospital setting or are not recommended for the treatment of coronavirus patients (COVID-19) to prevent COVID-19 disease. Patients who use hydroxychloroquine or chloroquine as FDA-approved in the treatment of malaria and autoimmune diseases continue to use as recommended under physician advice and control. The benefits outweigh the risks if these drugs are taken at the recommended dosage. In the process that continues with the use of hydroxychloroquine or chloroquine, it is emphasized that medical support should be used in case of dizziness, fainting or any irregularities in the heart rhythm (U.S. Food and Drug Administration 2020).

Research is ongoing in different clinics to support the theoretically expressed effectiveness of HCQ and CQ drugs against COVID-19 infection. Chloroquine and hydroxychloroquine were explored by the U.S. Food and Drug Administration (FDA) for the treatment of COVID-19. Based on accumulated scientific data on June 15, 2020, FDA revoked it's emergency use authorization (EUA) to use hydroxychloroquine and chloroquine to treat COVID-19 in certain hospitalized patients, except in defined clinical trials. The determination was based on results from a large, randomized clinical trials in hospitalized patients that found these medicines displayed little or no benefit in decreasing the likelihood of death or speeding recovery. These results were consistent with data in the literature, including those showing the suggested dosing for these medicines are unlikely to kill or inhibit the virus that causes COVID-19.

Ivermectin

Ivermectin causes an increase in the permeability of the cell membrane to chloride ions by hyperpolarization of the nerve or muscle cell, after binding with high affinity to the glutamate-gated chloride channels in the nerve and muscle cells of invertebrates (Figure 3). In some studies; for Ivermectin, a depolarizing agent is proposed instead of a hyperpolarizing role in the glutamate-gated chloride channel. In both cases, however, the result results in deactivation of the channel by manipulating chloride levels (Lv et al. 2018; Caly et al. 2020).

In a cell culture study, when the vero/hSLAM cells treated with COVID-19 virus were applied to ivermectin at a concentration of 5 mM, they detected a decrease in the RNA of 5000 snow virus compared to the control experiment. In the light of the findings obtained, the mechanism by which the ivermectin drug acts by inhibiting the a/β receptor of the import (IMP) in the virus (which acts in the protein mechanism of the virus to transport the protein to the cell nucleus) has been proposed. In addition, it has been proposed to consider ivermectine as an antiviral drug (Caly et al. 2020).

In cell culture studies performed in *in vitro* studies performed in ivermectin, it was found to be highly effective against SARS-CoV-2 and to stop the virus in the replication stage. However, more randomized clinical trials are needed. In the light of the findings, it is hoped that patients with COVID 19 symptoms will be given oral doses and results will be obtained in less than 48 hours. Thus, the safe use of an important treatment agent will be supported by clinical studies. The treatment of COVID-19 patients was evaluated and ivermectin was reported to be safe in a single daily dose in dengue patients in Thailand, but without any clinical benefit. According to the data obtained from the results of the study; it has been noted that a dosing regimen of COVID-19 drug of ivermectin drug can be developed (Caly et al. 2020).

Lopinavir/ritonavir (LPV/r)

Lopinavir is a protease inhibitor and was first used to treat HIV infection. In some *in vitro* studies; Lopinavir has been reported to inhibit SARS–CoV and the IC_{50} (IC_{50}: 0.64–0.77 ng/mL) value of the drug is acceptable .

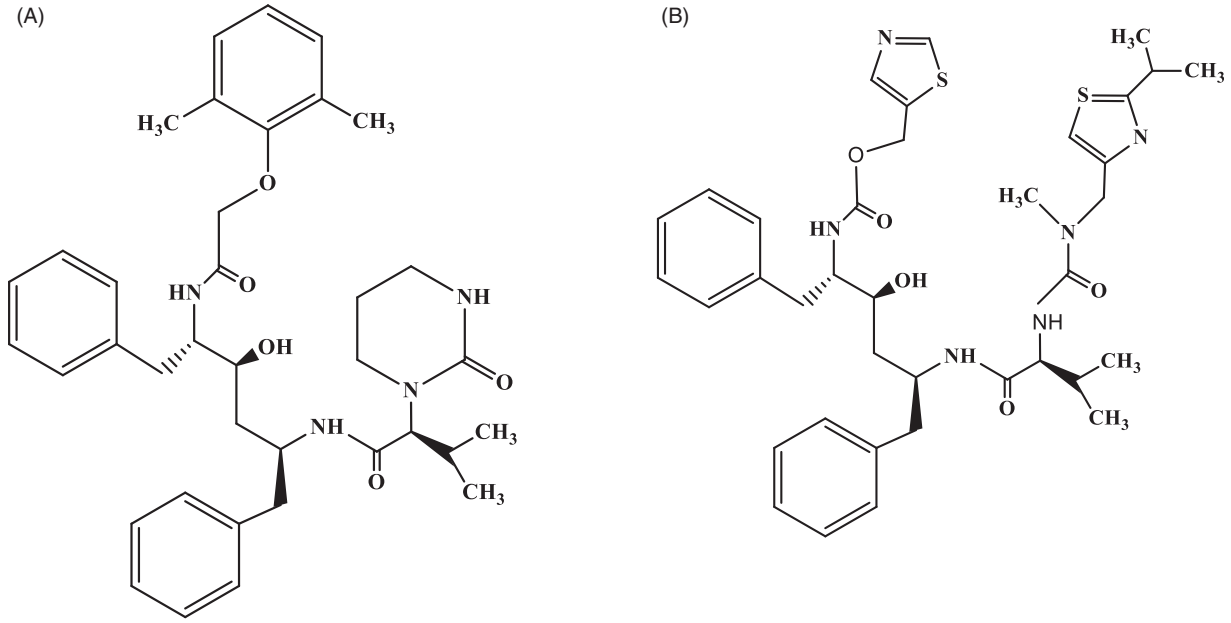

Figure 4. Chemical structure of Lopinavir (A) ve Ritonavir (B) drugs.

Chemical structure of Lapinavir was given in Figure 4. The protease enzyme is an important enzyme that allows the coronavirus to show its activity, and when lopinavir and/or ritonavir drugs are administered *in vitro*, they show anti-coronavirus activity by inhibiting the mechanism of action of the virus by inhibiting the protease (Taura et al. 2013). Another viral mechanism of action is Lopinavir/Ritonavir; it has been argued that it causes oxidative stress in cells, changes mitochondrial morphology and causes apoptotic cell death. Another hypothesis is; Lopinavir/Ritonavir drugs were found to show antiviral activity in the presence or absence of caspase-3 and −9 inhibitors. Especially; it has been demonstrated that SARS patients treated with Lopinavir/Ritonavir are significantly effective in their early use. In addition; it has been determined that the use of Lopinavir/Ritonavir is more effective than using Ribavirin alone and significantly reduces the risk of death (Gratton et al. 2018).

Nitazoxanide

Nitazoxanide (2-[(5-nitro-1,3-thiazol-2-yl)carbamoyl]-phenyl acetate) is a prototype member of thiazolites, a class of drugs that are chemically synthetic nitrothiazolyl-salicylamide derivatives (Figure 5). Nitazoxanide protozoal is a broad spectrum antiparasidic and antiviral drug used to treat helminthic and viral infections. Nitazoxanide has also been used to treat influenza (White 2004; Rossignol 2014). In *in vitro* studies using Nitazoxanide and its metabolite tisoxanide, Vero E6 cells were found to be effective against SARS CoV-2

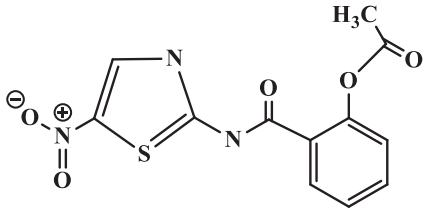

Figure 5. Chemical structure of Nitazoxanide drug.

and MERS CoV. In addition, the drug has been found to have highly effective broad spectrum antiviral activity against parainfluenza, influenza, rotavirus, respiratory syncytial virus and norovirus (Rossignol 2016).

The mechanism of action of the drug Nitazoxanide is believed to be due to the interaction with the pyruvate: ferredoxin oxidoreductase (PFOR) enzyme-dependent electron transfer reaction, which is necessary for anaerobic energy metabolism. The most accepted hypothesis in the mechanism of action of the drug Nitazoxanide is that pyruvate: ferredoxin/flavodoxin oxidoreductase (PFOR) disrupts the energy metabolism in the cycle and inactivates anaerobic microorganisms (Broekhuysen et al. 2000). Nitazoxanide drug is active *in vitro* against both facultatively anaerobic gram positive and gram negative bacteria. It is also active against *Mycobacterium tuberculosis* replica and non-replicated strains (Dubreuil et al. 1996). It has been suggested to act on parasitic-protozoa and anaerobic bacteria by inducing lesions in Nitazoxanide cell membranes and by storing the mitochondrial membrane while inhibiting the enzymes of quinone oxidoreductase (NQO1), nitroreductase-1 and protein disulfide isomerase enzymes (Dubreuil et al. 1996). Nitazoxanide stops viral

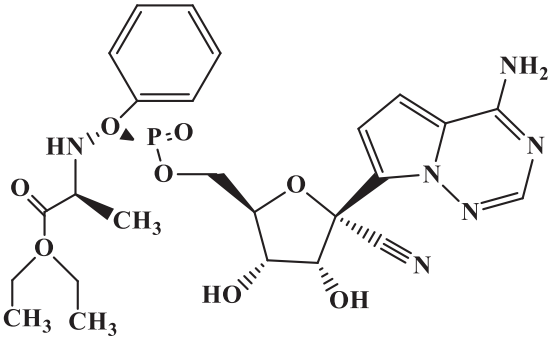

Figure 6. Chemical structure of Remdesivir drug.

replication by activating the eukaryotic translation initiation factor 2a by inhibiting it in the first phase of the viral transcription factor. In addition, its effectiveness has been determined on tumor cells (Shakya et al. 2018).

It is believed that this broad spectrum antiviral activity mechanism of Nitazoxanide interacts with host-regulated pathways involved in viral replication rather than virus-specific pathways. Nitazoxanide greatly enhances cytoplasmic RNA detection and type I IFN pathways, regulating natural antiviral mechanisms. Due to its broad spectrum antiviral activity, Nitazoxanide is being investigated in clinical trials, including randomized controlled ones for the management of influenza and other acute respiratory infections, although the results are not yet encouraging or available. Although the *in vitro* activity of nitazoxanide against SARS-CoV-2 has positive results, more datum is needed to determine its role in the treatment of COVID-19. It is available in countries currently using this drug in the treatment of COVID-19.

A total of 8 studies on clinical applications of Nitazoxanide drug in patients infected with COVID 19 have been reported. Four of these studies were carried out in Egypt. From the general results obtained, it was determined that when the drug nitazoxanide was administered to patients at a dose of 600 mg twice daily for 5 days, it reduced symptoms in mild patients. It was also determined that it reduces the risk of mechanical ventilation in clinical applications in patients with COVID.

Remdesivir

Remdesivir (2-ethylbutyl (2S)-2-{[(S)-{[(2R,3S,4R,5R)-5-{4-aminopyrrolo[2,1-f][1,2,4]triazin-7-yl}-5-cyano-3,4-dihydroxyoxolan-2- yl]methoxy}(phenoxy)phosphoryl]amino}propanoate) is a new antiviral drug of the class of nucleotide analogs, which can be mechanically metabolized to the ATP analogue that inhibits the RNA polymerase enzyme of the virüs (Figure 6). Remdesivir drug was originally developed by Gilead Sciences for the treatment of Ebola virus disease and Marburg virus infection. Later, Remdesivir was found to have a broad spectrum activity, which acts against many viruses, including Lassa fever virus, Hendra virus, Nipal virus, Junin virus, respiratory syncytial virus, including coronaviruses (including MERS and SARS viruses) (Warren et al. 2016; Lo et al. 2017).

With Covid-19 positive disease, which is a SARS-CoV-2 infection, patients who were treated with different doses of remdesivir were followed up during the treatment process, while inhaling patients with ambient air or receiving oxygen supplements. From the findings, an improvement of 68% was observed in patients with Covid 19. Remdesivir drug COVID was administered to randomly applied to 1063 patients in 19 infected patients and a shortening of the recovery time was determined. The median recovery time of patients receiving remdesivir was determined to be 11 days. This is also tired as it contributes to the treatment period. However, there are also opinions that Remdesivir is not very effective in the subsequent treatments (Amirian and Levy 2020; Beigel et al. 2020).

Effect mechanism of Remdesivir drug; as a nucleoside analogue, it is in the form of the metabolite competing with the adenosine triphosphate (ATP) to join the newly produced RNA strip after the remdesivir is metabolized and converted into NTP. By including this formed NTP in the new RNA strip, RNA synthesis is inhibited and RNA synthesis is stopped (Holshue et al. 2020).

Although SARS-CoV derivatives can detect other nucleotide analogues by destroying them and becoming resistant, remdesivir prevents the formation of viral resistance by providing the opposite effect and provides antiviral effect (Morse et al. 2020). In a study; Agostini et al reported that remdesivir is highly effective against hepatitis virus (MHV) (Agostini et al. 2018). Also, some findings have shown that remdesivir can be effective against different viruses and if viruses mutate (Sheahan et al. 2017; Agostini et al. 2018).

Plasma therapy

There is no specific drug or vaccine therapy for SARS-CoV-2 epidemic disease worldwide which has been proven to be safe and effective. Drug and vaccination studies for the treatment of SARS-CoV-2 disease are still continuing all over the World (Eickmann et al. 2018). The plasma as well as immune therapy was introduced in Turkey. Immune plasma therapy has been used in epidemics in the past, such as SARS, MERS, Ebola, Swine

Flu (H1N1), Avian Influenza (H5N1) (Cao et al. 2007; Mora-Rillo et al. 2015; Arabi et al. 2016). The basis of immune plasma therapy; Transfusion/transplantation of the antibody-containing plasma obtained after the removal of the blood of the patients who have suffered SARS-CoV-2 disease and healing from the plasma and separation (transfusion/transplant) is based on the principle of ;passive immune transplant.' It is obtained from patients who have had plasma disease and the result of COVID 19 test is negative and can be stored for 5 years under appropriate conditions after ingestion (Shen et al. 2020). It is considered that the administration of immunoglobulins (antibodies) to COVID 19 patients by transfusion is generally safe and has a very low risk. It has been reported that approximately 1% fever, itching, rash and other allergic reactions are seen. Viral hepatitis, HIV (AIDS) incidence ranges from one to ten thousand to five hundred thousand.

Turkey algorithm

During the control and treatment of Covid-19 disease, Turkey has successfully completed the analysis of the obtained data and create its own algorithm. In this process, Turkey has stocked the essential drugs in the treatment before the virus spread to 19 countries borders. During the whole pandemic process, thanks to the treatment algorithms applied to patients infected with covid 19, Turkey has been more successful than most other countries in a pandemic period. In addition, the mortality rate in Turkey is also very low.

2019-NCover implemented in Turkey Turkey algorithm was created by the Ministry of Health in the fight against the virus and treatment process can be summarized as follows:

In Turkey, Covidien 19 will be applied for the treatment algorithm; with the combination of drugs used in the treatment of AIDS, some drugs used in the treatment of malaria were started to be used.

The algorithm prepared for adults already includes a specific antiviral therapy for Covid-19, which has been proven to be safe and effective. However, there are studies using various antiviral treatments from different countries, especially China, according to the disease table and the severity of the disease. It was determined that the antivirals used in these studies were effective and contributed positively to the regression of the clinical findings and the healing processes of the patients. This treatment of lopinavir/ritonavir (drugs used in HIV and AIDS) and hydroxychloroquine quinine combinations (drug used to treat malaria) drugs are licensed in Turkey. Positive effects were seen in the use of these drugs in cases.

In 2019-nCoV positive patients, lopinavir/ritonavir and hydroxychloroquine treatment are given to people aged 60 and over. However, lopinavir/ritonavir and hydroxychloroquine treatment is applied if the patient determined to be 2019-nCoV positive is under the age of 60 and if there is no comorbid disease and the severity of the disease is severe pneumonia (pneumonia).

Turkey has verified that immune plasma treatment is particularly applicable to Covidien 19 patients under intensive care and quite promising findings of the obtained first (Duan et al. 2020). Immunoglobulins (antibodies) obtained from blood plasma have been started to be administered to patients in intensive care units who have breathing difficulties connected to the respiratory device and have been described as having therapeutic properties.

It is stated by the authorities that success is achieved and the epidemic is kept under control in the ongoing treatment algorithm. In this case, it is stated that previously required 2019-nCoV as the virus by taking lessons from the experience of struggling countries in 2019-nCoV Turkey as Turkey reached success created by algorithms based on the positive results of treatment patients.

Of course, it is stated that the struggle and the strict implementation of the measures should be continued without sacrificing the measures without compromise. Only in this way, the signal is given will gradually return to normal life within an additional period of one month in Turkey.

Conclusion

In these days when the world is fighting against 2019-nCoV, it has been found that viral drugs that have previously been acting against viral infections by RNA synthesis inhibitor, anti-inflammatory, some enzyme inhibition mechanisms are effective *in vitro* and in vivo. It has been determined that antiviral drugs listed above are effective in the treatment of new respiratory infectious diseases. However, the findings obtained by further clinical studies need to be confirmed. Overall, there are no drugs or vaccines developed against 2019-nCoV yet. All drug trials come from the experience of treating SARS, MERS or some other new influenza viruses that have been previously identified and originated in 2019-nCoV.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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