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Review Article

COVID-19 and the Challenges it Poses are Discussed

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Abstract

In China, the SARS-CoV-2 coronavirus, also known as the severe acute respiratory syndrome coronavirus (SARS-CoV-2), initially emerged and subsequently spread across the world, resulting in coronavirus disease 19 (COVID-19), a highly infectious and often fatal viral infection.

A genomic study indicates that SARS-like bat viruses, which is known as SARS-CoV-2, are phylogenetically related to SARS-CoV-2, suggesting that bats are the virus's primary host. While the intermediate source of genesis and transfer to humans has yet to be discovered, many investigations have confirmed the rapid transmission from human to human. There is presently no antiviral drug or vaccine that has been clinically approved for use against COVID-19. However, fewer broad-spectrum antiviral medicines have been tried in clinical trials against COVID-19, and only a handful have shown clinical improvement. This research describes and compares the progression and pathogenicity of COVID-19 infection with those of other human coronavirus infections, such as SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV) (MERS-CoV). The techniques for developing effective vaccines and therapy combinations to combat the present viral pandemic are also thoroughly addressed.

Keywords: The Genesis and Pathogenicity of the Coronavirus Disease 19 (COVID-19) Infection; The Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV); and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (MERS-CoV) Treatment and Vaccine for COVID-19 COVID-19 Saudi Arabia's Madinah Munawara

Introduction

Wuhan people in China, all of whom were initially diagnosed with pneumonia of unknown origin, were identified as the original source of the SARS-CoV2 virus, which was first discovered by the World Health Organization in December of last year, said the WHO [1].

As the year 2020 progressed, this new coronavirus strain grew more and more responsible for the catastrophic development of coronavirus disease-19 (Covid-19), which has already killed more than 100,000 people worldwide. As of November 2020, the epidemic has claimed the lives of more than 1.3 million individuals in 227 countries and territories, an increase from the previous months [2].

Despite the fact that these findings are very concerning, the mortality rate for Covid-19 is just 2.3 percent, which is still a low rate. which is much lower than comparable outbreaks such as the SARS-CoV epidemic during the year 2003 (9.5 percent) and the MERS epidemic in 2012 in the Middle (%34.5) East [3].

One of the most affected countries in the Middle East due to the MERS-CoV outbreak was the Kingdom of Saudi Arabia (KSA), a

huge country that holds both massive territory and immense economic value. It was not only the epicenter of the MERS-CoV outbreak, but. Not only was it the epicenter of the MERS-CoV epidemic, but was also the worst impacted GCC nation with the highest illness death rate and the third most confirmed cases in the Middle East behind Iran and Iraq. Riyadh, the capital of the Kingdom, has the greatest number of infected populations with SARS-CoV2, and the prevalence of pre-existing illness such as high blood pressure, according to the World Health Organization inhabitants and citizens.

The prevalence [4] of pre-existing diseases like as hypertension. and diabetes mellitus (DM), as well as elevated inflammatory markers, were shown to be among the most common indications of poor prognosis in 191 SARS-CoV2 infected individuals in Wuhan, according to preliminary data [5].

Conclusions have often shown to be the same in many countries [6-8]. There will be the first national statistics from KSA in March, 2020. The findings in this study revealed that 1519 confirmed patients (age: 36 years on average) had the most often found comorbidities of hypertension (8.8 percent) and diabetes (7.6 percent) [9].

The accumulation of epidemiologic data has made it more apparent that type 2 diabetes and other chronic, noncommunicable illnesses seem to have a detrimental impact on clinical outcomes in the Covid-19 study [10,11]. Since coronaviruses have an affinity for ACE2, questions have been raised regarding the use of anti-hypertensive medications such as ARBs, GAMs, CCBs, and ACE inhibitors, before being shown to be safe and protective against Covid-19 [12,13]. Patients who take an ARB (valsartan) with a neprilysin inhibitor (sacubitril) are less likely to die from cardiovascular reasons or be the first to have heart failure worsening, as You may also die as a result of any reason [14]. kidney function, and minimizing proteinuria rather than treating the disease itself. Early diabetic nephropathy, at least in animal models, is associated with a reduction in tubular damage and improvements in renal ultrastructure [15]. a situation that requires our immediate attention need to update and extend the scant knowledge on the ever-changing Covid-19 demography, especially in underrepresented areas such as the Middle East and Saudi Arabia, where chronic noncommunicable illnesses such as diabetes are prevalent [16]. Data that exists from geographic locations and healthcare systems other than the Far East and Western parts of the world may offer unique insights on this current epidemic, which is continuing. While the medical community has concluded that diabetes and other chronic illnesses increase morbidity and death, other ethnic minorities have been disproportionately impacted by the condition [17,18].

COVID-19 and diabetes are serious health concerns for the global population. COVID-19 has had a major impact on persons with diabetes; more than a decade of that pandemic has shown persons with diabetes to be more prone to infection and hospitalization. Because diabetes is one of the most serious health problems in Saudi Arabia, this paper discusses the views of COVID-19 in individuals with diabetes, as well as the measures made by the government to reduce the consequences of the disease. The majority of COVID-19 patients in Saudi Arabia have a mild illness, while those with diabetes are at a greater risk of disease severity and mortality. Coronavirus disease 2019 (COVID-19) and diabetes have serious health consequences for people all over the globe. As a result of the COVID-19 pandemic, diabetes has had a significant effect; diabetics have been found to be more susceptible to infection and hospitalization throughout the duration of the epidemic in the nation. Infection with COVID-19 pneumonia, a disease that has just recently been discovered yet is rapidly spreading across the world and causing substantial disability and death. Some diseases, for instance diabetes, is continuously suggested as a risk factor which contributes to the severity and mortality of COVID-19. However, as of now, there are no extensive research looking to explore the actual link between diabetes and COVID-19.

The presence of diabetes among Covid-19 patients who are admitted to the hospital is noteworthy. DM patients had a greater death rate than their non-DM counterparts, although other variables like as age, congestive heart failure, smoking, usage of β-blockers, and the presence of bilateral lung infiltrates all come into play. increased creatinine levels, as well as a significant vitamin D deficiency It seems that there are more significant indications of a fatal result. Patients who present with acute metabolic dysfunctions, such as hyperglycemia, are more likely to need intensive care when they are admitted to the hospital [1].

COVID-19 vaccine

When it enters the body, the COVID-19 Vaccine works to protect the immune system by neutralizing the virus, while at the same time bolstering the system's resistance. It creates antibodies and

recalls the illness and how to combat it, thus preventing the infection from taking hold again. The vaccine is safe since it has successfully passed through all of the vaccine testing phases, has a robust immune response, and produces long-lasting antibodies. The vaccination is administered via an injection into a muscle, with two doses of the vaccine given three weeks apart from one another.

The four most common types of covid-19 vaccine are as follows

WHOLE VIRUS, PROTEIN SUBUNIT, VIRAL VECTOR, and NUCLEIC ACID are four vaccines currently being investigated in clinical trials. WHOLE VIRUS vaccines are the most common form of the vaccine (RNA AND DNA). Some of them attempt to sneak the antigen into the body, while others manufacture the viral antigen using the host's own cells.

Whole virus

To elicit an immune response, many traditional vaccinations utilize entire viruses. The primary approaches to dealing with this problem are twofold. In live attenuated vaccines, a weakened form of the virus is utilized, which can still replicate but does not cause illness in the recipient. Inactivated vaccines utilize viruses that have had their genetic material destroyed, making them unable to reproduce but still capable of eliciting an immune response. Both kinds utilize well-established technology and regulatory approval procedures, although live attenuated ones may cause illness in individuals with weakened immune systems and need careful cold storage, making their application in low-resource nations more difficult. People with weakened immune systems may get inactivated viral vaccinations, although they may need cold storage.

Protein subunit

Parts of the pathogen, usually protein fragments, are used to elicit an immune response in patients who receive subunit vaccinations. While doing so reduces the likelihood of adverse effects, it also increases the possibility of a weakened immunological response. As a result, adjuvants are often used in conjunction with vaccines to assist enhance the immune response. Subunit vaccinations are now available in the form of the hepatitis B vaccine.

A type of acid is known as nucleic acid

Nucleic acid vaccines, which include genetic material in the form of RNA or DNA, are used to educate cells on how to make antigens. COVID-19 is often associated with the viral spike protein. The antigen is created inside our cells, using our cell's protein factories. In this context, the benefits of these vaccinations are that they are simple to produce and affordable. It is expected that the immune reaction would be strong since the antigen is produced in large quantities inside our own cells. As of yet, no DNA or RNA vaccines have been authorized for human use; nevertheless, this may result in additional regulatory hurdles in the future. Furthermore, RNA vaccines must be kept at ultra-cold temperatures of -70 degrees Celsius or below, which may be challenging for countries without specialist cold storage equipment, particularly in low- and middle-income countries, to achieve.

Viral vector

Viral vector vaccines also function by instilling genetic instructions into cells, instructing them to manufacture antigens. However, they vary from nucleic acid vaccines in that they convey these instructions into the cell via the use of a harmless virus that is not the same as the virus that the vaccine is targeting. Adenovirus, the virus that causes the common cold, is one kind of virus that has been used as a vector in the past to spread disease. Nucleic acid vaccines function in the same way: by hijacking our own cellular machinery, instructions in our DNA may be used to manufacture the antigen, and this leads to the induction of an immune response in the target organism. Viral vector vaccines have the ability to imitate natural viral infection and, as a result, should elicit a robust immune response. However, since there is a possibility that many individuals have previously been exposed to the viruses that are being used as vectors, some people may develop immunity to the vaccine, making it less effective.

The main components of vaccines

- **Antigen:** A chemical that stimulates the immune system so that it can identify the virus or bacterium that the vaccination is designed to protect against.
- **Preservative:** Used to keep the vaccine from being contaminated once it has been opened.
- **Stabilizers:** These prevent chemical reactions within the vaccine from happening and the vaccine components from adhering to the vial.
- **Active substances:** Active ingredients are used to ensure that all vaccination components are kept in proper balance.

- **Residual by-products:** Are small amounts of different preparations used in the manufacturing or development of vaccines.
- **Adjuvants:** Are liquids that are used to dry down vaccines so that they reach the proper concentration before being administered.
- **Auxiliary material:** s are substances that are added in certain vaccinations to help the immune system respond better to the vaccine.

Aspects of COVID-19 therapy that may be considered

Interferon-nebulization, broad-spectrum antibiotics, and antiviral medicines were first employed to decrease the viral load; however, only remdesivir has shown a promising effect against the virus. The results of a small study revealed that treatment with Remdesivir (either alone or in combination with chloroquine or interferon beta) substantially reduced SARS-CoV-2 replication, resulting in clinically recovered individuals [20]. A number of other anti-viral medicines are now being evaluated for their efficacy in combating infection in humans. The antibiotics AAK1, Baricitinib, and Arbidol have only moderate success when tested in people and in vitro clinical isolates. Nafamostat and Nitazoxanide showed a moderate level of efficacy in combating infection in people and in vitro clinical isolates.

There have also been many additional combinations tested, such as mixing the antiviral or antibiotic with traditional Chinese remedies, against SARS-CoV-2 caused illness in people and animals. Doctors in Shanghai recently took blood plasma from COVID-19 patients who had recovered clinically and injected it into infected patients, who recovered quickly and had good outcomes [21]. In a recent research, it was discovered that a monoclonal antibody (CR3022) binds to the spike RBD of SARS-CoV-2 and inhibits its replication. Most likely, this is because the antibody recognises a non-overlapping ACE2 receptor-binding motif. CR3022 may potentially be used to prevent and treat COVID-19 infections as a therapeutic approach [20].

After covid-19

There is a great deal of ambiguity about how the COVID-19 epidemic will end and what will be left behind once it does. Increased HbA1c in persons impacted by national crises may occur up to 16 months after the event, with some research suggesting that this is especially true for persons from lower socioeconomic backgrounds and those who are on insulin therapy. Lack of access to normal health care following catastrophes is a primary cause of morbidity and death; stroke, acute myocardial infarction, and diabetic complications have all been found to rise after the immediate danger has passed. Services such as diabetic clinics, for example, may need to reconsider their organizational structure in order to reduce the likelihood of continuous transmission [19].

Symptoms

When people are diagnosed with COVID-19, they may have a broad variety of symptoms, which can vary from minor symptoms to severe disease. Symptoms may develop anywhere between two and fourteen days following the initial exposure to the virus. The symptom experience may vary from just mildly bothersome to quite bothersome. In some individuals, COVID-19 virus produces these symptoms. make an appointment with your doctor if you have a fever or chills.

Cough, breathing problems, such as shortness of breath or trouble breathing Fatigue Aches and pains in the muscles and throughout the body. Headache A new loss of flavor or scent has occurred. Throat discomfort If you have congestion or a runny nose, Nausea or vomiting may occur.

Diarrhea

This is not a comprehensive list of all potential symptoms. The Centers for Disease Control and Prevention will continue to update this list as additional information regarding COVID-19 becomes available. People over the age of 65 and those with significant underlying medical problems such as heart disease, lung disease, or diabetes seem to be at greater risk of having more serious consequences from COVID-19 sickness.

When should you seek emergency medical treatment?

For COVID-19, keep an eye out for emergency warning signs. If you or someone you know exhibits any of the following symptoms, get emergency medical attention right away:

- Difficulties in taking in air A new source of worry is chest pain or pressure that continues over a long period of time. Inability to awaken or retain awareness after a sleep. Skin, lips, and nail beds that are light, gray, or blue in color, depending on the individual's skin toneCOVID19 has been

proven to be transmitted from person to person in several instances.

Respiratory droplets produced when a sick individual coughs or sneezes are thought to be how MERSCoV and SARSCoV are communicated. Individuals that live in close proximity to one another are said to transmit the trait from person to person, according to the research (within about 6 feet, or 2 meters). Respiratory droplets transmit the virus when an infected person coughs, sneezes, or talks [22].

Protect yourself against contracting COVID-19 by doing the following, according to the World Health Organization and the Centers for Disease Control and Prevention (CDC) [23].

Stay away from big gatherings and activities. Avoid being in close proximity to anybody who is ill or has symptoms (within 6 feet, or 2 meters). If COVID-19 is spreading in your neighborhood, keep your distance from others, particularly if you have a greater risk of severe disease.

Hands should be washed with soap and water for at least 20 seconds or with an alcohol-based hand sanitizer containing at least 60% alcohol before eating or touching anything. While coughing or sneezing, cover your nose and mouth with your elbow or a tissue to avoid infection. - Tissues should be disposed of properly in the trash can. It's important to keep an eye on your hands at all times and prevent allowing them to get too close to your eyes, nose, or mouth. Desks, worktops, and tableware should all be cleaned and disinfected since they are often handled by employees and visitors.

Diagnosis

In the same way as, other viral infections are diagnosed, SARS-CoV-2 infection is diagnosed via the detection of viral RNA or antigens or through the detection of particular antibody responses, as in other viral illnesses. A direct diagnosis of current infection is the gold standard, while the detection of anti-SARS-CoV-2 antibodies serves as the basis for identifying past contact with the virus, which is important for both diagnostic and epidemiological reasons in the case of a previous infection [24].

A clinical approach to directly confirming SARS-CoV-2 infection

The identification of SARS-CoV-2 RNA in nasopharyngeal swabs or lower respiratory tract materials is the only way to make a definitive diagnosis of SARS-CoV-2 infection in the absence of other factors [24].

It is the former that is the most often utilized in clinical practice, whereas testing on lower respiratory tract specimens is only done in a small number of specific situations. 36 The presence of viral RNA is found until at least 20 days after the start of symptoms in patients who have a favorable result, and a resurgence of the viral load, which was previously undetectable with PCR, is conceivable [25].

Furthermore, real-time PCR detection of SARS-CoV-2 RNA was greatest in upper respiratory tract specimens from 7 to 10 days after the onset of symptoms, but reduced in lower respiratory tract specimens [25].

Short turnaround time, high throughput, minimum batching, low infrastructure needs, high accuracy, and cheap cost are all features of ideal testing for the direct detection of SARS-CoV-2 infection. This is done while simultaneously considering testing priorities for diagnosing vulnerable groups and preventing viral spread, especially in nosocomial, family, and community settings, as well as testing priorities for diagnosing vulnerable populations and preventing viral spread. As a result of these features, real-time quantitative PCR (rt-qPCR) on respiratory tract specimens is the gold standard for diagnosing SARS-CoV-2 infection at the present moment. Due to procedural and virus-related issues, such as one time point, dependability may be reduced. This is further exacerbated by a lack of staff and resources. New fast tests (based on antigens or antibodies), point-of-care (POC) assays, and digital technologies would all help to improve infection identification and containment, especially in low- and middle-income countries, but they would need to be carefully evaluated first [26,27].

Treatment consists of the following steps

Therapy with antiviral drugs

Lopinavir/ritonavir

Lopinavir is a human immunodeficiency virus (HIV) protease inhibitor (HIV).It has shown in vitro efficacy against the SARS-CoV-1 virus, which caused the severe acute respiratory syndrome (SARS) in 2003. Its half-life is lengthened when taken with ritonavir. It also exhibits antiviral properties against the coronavirus MERS-CoV. (Middle East respiratory syndrome) [28].

Remdesivir

In the class of nucleotide analogs, Remdesivir is a prodrug. This compound is converted intracellularly to form an active triphosphate adenosine analog that inhibits the replication of viral polymerase RNA. A number of viruses from the filovirus family (such as the Ebola virus and the Marburg virus) as well as coronaviruses (such as SARS-CoV-1 and MERS-CoV) and paramyxovirus (such as the respiratory syncytial virus) have been shown to be resistant to it. Remdesivir has also been studied as a potential prophylactic against MERS and SARS infections in animal models, with promising results.

There are less interactions with Remdesivir as compared to other antiviral medications, and the drug's safety profile has been shown in stage 1 trials including over 500 patients with Ebola virus infection [29].

Hydroxychloroquine and azithromycin

It has been found to have in vitro activity against a variety of RNA viruses, including the SARS-CoV-2 virus, when administered as part of an antimalarial regimen including hydroxychloroquine (Hydroxychloroquine). Hydroxychloroquine is a 4-aminoquinoline antimalarial drug. This drug's potential in vivo impact, on the other hand, remains a mystery at this time. Hydroxychloroquine is believed to operate via a variety of mechanisms.

Viral entrance inhibition, viral release inhibition into the host cell, endosomal protease inhibition, viral infectivity reduction, and immunological modulation are only a few of the treatment options accessible to clinicians. In vitro research has shown that hydroxychloroquine is more effective than chloroquine in inhibiting COVID-19 than chloroquine at doing so. Individuals receiving a safe hydroxychloroquine sulfate dose had blood levels of 1.4 - 1.5 M. (6 - 6.5 mg/kg/day) of hydroxychloroquine sulfate, which is adequate to prevent SARS-CoV-2 infections in principle. Individuals receiving a safe hydroxychloroquine sulfate dose had blood levels of 1.4 - 1.5 M. (6 - 6.5 mg/kg/day) of hydroxychloroquine [30].

Azithromycin has also been used in conjunction with hydroxychloroquine in certain cases. In a trial conducted in France with a limited sample size and other methodological flaws, researchers claimed that treatment with hydroxychloroquine accelerated the virus's transition from the seropositive to the seronegative condition. Also, that when azithromycin was taken in conjunction with other antibiotics, the condition improved significantly [30].

Interferon-β 1b

Known for its antiviral and immunoregulatory properties, interferon-b is used to treat multiple sclerosis. Interferon-1b has been shown to have antiviral efficacy against the SARS-CoV and MERS viruses in vitro. A decrease in the MERS virus load in animal models has also been shown, which is encouraging. HIV patients have taken it in addition to lopinavir/ritonavir or in monotherapy for its anti-HIV effect. In a stage 2 clinical study conducted in Hong Kong, 127 patients were randomized to receive either lopinavir/ritonavir or lopinavir/ritonavir in combination with ribavirin and interferon-b or lopinavir/ritonavir alone. This study demonstrated that using this combination resulted in a negative viral C-reactive protein (CRP) test significantly more quickly. Because of the pro-inflammatory effects of interferon-1b. Previously, it was discovered that interferon inhibits the activity of the enzyme cytochrome P450. As a result, any medication interactions should be taken into consideration. These are among of the most often reported adverse effects, and people often complain of flu-like symptoms such as fever, chills, headache, and joint or muscle aches. Other side effects include nausea and vomiting. There have also been reports of hypoglycemia, diarrhea, elevated transaminase levels, anemia, and thrombocytopenia, among other symptoms [31].

Anti-inflammatory therapy

Corticoids

The immunological response of the patient seems to be essential in the pathogenesis of both acute lung damage and acute respiratory distress syndrome (ARDS). Patients with COVID19, particularly those suffering from pneumonia and acute respiratory distress syndrome (ARDS), exhibit elevated levels of pro-inflammatory cytokines and other inflammatory biomarkers. As a result, some writers recommend for the use of steroids to patients in this category. Results found in other viral infections, on the other hand, indicate that their systemic administration may be helpful while simultaneously being linked with an increase in viral multiplication and dispersion. While on the other hand, it is currently uncertain whether or not the findings of clinical studies using corticoids in patients with acute respiratory distress syndrome (ARDS) can be generalized to individuals with COVID-19. The explanation for this is because these trials involve individuals who have ARDS due to

extrapulmonary reasons or who have ARDS that is not caused by an infectious agent [32].

Immunomodulatory therapy

As has been observed in other coronavirus-associated diseases such as SARS, in which the presence of extremely high serum levels of proinflammatory cytokines such as interleukin-6 (IL-6), tumor necrosis factor, and IL-12 has been confirmed; and MERS, in which the high production of IL-6, IL-1b, and IL-8 has also been confirmed; the cytokine storm appears to be the primary mechanism responsible for the death of patients with SARS. There are high levels of cytokines such as interleukin-6 and interleukin-2, as well as granulocyte colony-stimulating factor, interferon gamma-inducible protein (IPI0), macrophage inflammatory protein 1a (MIP1A), and monocyte inflammatory protein 1 (MIP1A). MCP1 (chemoattractant protein) and tumor necrosis factor-alpha (TNF-alpha). Because of the rapid activation of monocytes and T cells, IL-6 and granulocyte colony-stimulating factor are released into the bloodstream, triggering an inflammatory response that may be responsible for the altered gas exchange between the alveoli and capillaries, as well as the progression to pulmonary fibrosis and organ dysfunction. Several cytokines, including those listed above, seem to be related with the severity and prognosis of the illness [33].

Tocilizumab

A monoclonal recombinant antibody called tocilizumab binds and inhibits both the soluble and membrane-bound IL-6 receptors. It is often used in the treatment of rheumatoid arthritis (RA). Additionally, it is used in the treatment of cytokine release syndrome after CAR-T therapy (Chimeric Antigen Receptor T cell therapy). Because it works on the receptor rather than the circulating IL-6, the IL-6 levels are not helpful for evaluating the response of therapy, as they may actually rise after it is administered, indicating that the treatment is working.

Patients with COVID-19 of varying degrees of severity are now being recruited for a number of clinical studies, which include Too far, however [34].

Sarilumab

Sarilumab is another IL-6 receptor antagonist that is also used to treat RA and is now being investigated in individuals with COVID-19 who have varying degrees of severity in various clinical studies. Sarilumab is also used to treat RA (NCT04357808, NCT04315298, NCT04327388, NCT04324073, NCT04322773). We do not, however, have access to the clinical findings at this time. It is not accessible to the public outside of a clinical study environment [35].

AP-2 associated protein kinase 1 inhibitors

Baricitinib, fedratinib, sunitinib, and erlinitib are AAK1 inhibitors that target the AP-2 associated protein kinase 1 (AAK1). The AAK1 gene is a transcriptional regulator of clathrin-mediated endocytosis, which is the mechanism by which most viruses enter the cell. There are many drugs in this class that have severe adverse effects, which raises questions about their effectiveness in patients with COVID-19. Fedratinib, sunitinib, and erlinitib are three of the most concerning. As a janus kinase (JAK) inhibitor, baricitinib, on the other hand, inhibits both virus cell entry and the inflammatory response that results as a result of the virus cell entry. As a result, it has been suggested that baricitinib could be used to reduce both virus cell entry and the associated inflammatory response. However, since it also has the impact of decreasing the interferon-mediated antiviral response, there are concerns regarding its potential efficacy in the long run [36].

Anakinra

Anakinra is an IL-1 recombinant receptor antagonist that is used to treat rheumatoid arthritis (RA) as well as Still's disease.

The analysis of the subgroup of patients with macrophage activation syndrome from a clinical trial that investigated the administration of anakinra in patients with sepsis and multiorgan failure revealed that the mortality rate was lower at 28 days compared to the placebo group at the time of the study. Known as hemophagocytic lymphohistiocytosis, the macrophage activation syndrome manifests as a cytokine storm that causes multiorgan failure, which is often fatal in a short period of time. The condition is most often linked with rheumatic illnesses, although it may also be brought on by viral infections. High levels of interleukin-1, interleukin-6, interleukin-18, soluble interleukin-2 receptor, FNT, and IFN-gamma have been reported. Several researchers have suggested that anakinra may be useful in the treatment of macrophage activation syndrome. In fact, some writers recommend that it be used to treat the cytokine storm caused by COVID-19 infection [37].

Ruxolitinib

Ruxolitinib (RXT) is a selective inhibitor of the Janus associated kinase family (JAK1 and JAK2), which are mediators involved in hematopoiesis and immunological function, and is approved for the treatment of cancer (they participate in the transduction of other proinflammatory and anti-inflammatory cytosines). RA, myelofibrosis, and polycythemia vera are among the conditions for which it is prescribed, and it has been suggested as a potential option for decreasing the notorious inflammatory cytokine storm... 71 As of right now, it is being examined in two clinical studies for the treatment of COVID-19 (NCT04362137, NCT04377620, NCT04334044, NCT04338958, and NCT04348695), but no results have been released as of yet.

Siltuximab (STX)

A kind of interleukin-6 (IL-6) inhibitor, siltuximab (SXT), is used in the treatment of Castleman illness in individuals who have tested negative for the human immunodeficiency virus and the herpes-8 virus.

In Italy, the results of a study involving 21 patients with COVID-19 who had pneumonia and ARDS and were treated with SXT were reported. They were given an IV dosage of 11 mg/kg (for 1 hour), followed by a second dose at the discretion of the attending physician, which was given to 5 patients in total. Three-quarters of the 21 patients saw an improvement in their clinical state, 43 percent saw a stabilization in their health, and 24 percent saw a worsening, with one patient dying. It should be noted that all 21 of these individuals were receiving non-invasive breathing assistance [38].

Antithrombotic prophylaxis and anticoagulation

Many patients with COVID-19 who stay in critical condition, particularly those who die, acquire coagulopathy as a result of their illness. It has been defined as a disease characterized by disseminated intravascular coagulation and as a state of variable hypercoagulability as determined by thromboelastography, followed by elevated levels of inflammatory markers in the blood. Patient thrombotic risk is increased by factors such as immobilization, inflammatory response, hypoxia, and the development of disseminated intravascular coagulation; conjecture exists as to the role that microvascular thrombosis plays in hypoxia and multiorgan failure [38].

Convalescent plasma therapy

Convalescent plasma treatment (CPT) has traditionally been used to both prevent and cure infectious illnesses, according to the literature. It has been used to treat SARS, MERS, and the 2009 H1N1 pandemic with great effectiveness. In a 32-study meta-analysis of infections caused by the SARS coronavirus and the influenza virus, it was confirmed that patients treated with CPT have a statistically significant lower mortality rate when compared to patients treated with placebo or no treatment at all (OR = 0.25; 95 percent confidence interval, 0.14 to 0.45). In ten patients with severe COVID-19, Duan., *et al*. evaluated the efficacy of PCT. They transfused 200 mL of plasma from patients who had recovered and had high antibody titers (1:640). The PCT transfusion had the following effects: 1) improved clinical symptoms and oxygenation parameters, allowing de-escalation from MV to HFOT and then from HFOT to conventional oxygen therapy; 2) fewer pulmonary lesions; 3) improved laboratory parameters (lympopenia, PCR, transaminases); 4) increased antibody titers and disappearance of SARS-CoV-2 RNA; 5) better prognosis -3 hospital. Patients did not experience any severe adverse effects throughout their treatment. They come to the conclusion that PCT may be a safe and easily accessible treatment alternative for individuals suffering with severe COVID-19. The optimum dosage and the best timing to provide the transfusion are still being determined in larger, more robust randomized clinical studies, which are now underway. Shen., *et al*. found comparable findings after recruiting 5 instances of patients with severe COVID-19 on MV, as they did in a previous study. All in all, there was no mortality in the transfusion group, as opposed to 30% in the control group, and there were no adverse effects in either of the two series examined [39].

IV immunoglobulin

Intravenous immunoglobulin (IVIg) has been utilized as adjuvant treatment to treat a number of infections both as a mixed product and as a more concentrated pathogen-specific antibody for many years (hyperimmune). When protective antibodies are present in the combined product, the likelihood of infection is increased.

Cao., *et al*. reported a case study of three patients who received large doses of IVIg at the onset of ARDS and recovered well on both the clinical and radiological fronts. Over the course of five days, high IVIg dosages (0.3-0.5 g/kg/day) were administered with no

adverse effects observed. Following the injection of IVIg, a significant clinical improvement was seen in all three patients. The time at which IVIg is given is of critical consideration. In fact, if systemic harm has already occurred, it is possible that there may be no advantages.

According to the IDSA's clinical recommendations, it is still unclear if intravenous immunoglobulin (IVIg) can be used in the treatment of SARS-CoV-2. According to the SSC, the regular administration of IVIg is not recommended. As a result, there is insufficient data to support or encourage the use of immunoglobulins without caution or cautionary caution [40].

Conclusion

Due to the lack of clear management guidelines for COVID-19, a variety of therapy regimens have been investigated in the treatment of the virus. Some of these therapies may have been attempted out of desperation, and some of them seem to have some potential at this point. However, it is too soon to see any published findings of rigorous clinical studies at this point in the process. The use of recovered patients' serum has been explored and evaluated, and clinical studies are now being conducted to determine its efficacy. This therapy seems to be beneficial in the short term, at least until more definite and successful therapies can be discovered and implemented.

Bibliography

1. Zhu N., *et al*. "A novel coronavirus from patients with pneumonia in China, 2019". *The New England Journal of Medicine* 382.8 (2020): 727-733.
2. Dong E., *et al*. "An interactive web-based dashboard to track COVID-19 in real time". *Lancet Infectious Disease* 20.5 (2020): 533-534.
3. Petrosillo N., *et al*. "COVID19, SARS and MERS: are they closely related?" *Clinical Microbiology and Infection* 26.6 (2020): 729-734.
4. Saudi Arabia Covid-19 Dashboard (2020).
5. Zhou F., *et al*. "Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study". *Lancet* 395.10229 (2020): 1054-1062.
6. Lai PH., *et al*. "Characteristics associated with out-of-hospital cardiac arrests and resuscitations during the novel coronavirus disease 2019 pandemic in New York City". *JAMA Cardiology* 2020 (2020): e202488.
7. Rezende LFM., *et al*. "Adults at high-risk of severe coronavirus disease-2019 (Covid-19) in Brazil". *Review Saude Publica* 54 (2020): 50.
8. Docherty AB., *et al*. "Features of 20133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study". *BMJ* 369 (2020).
9. Alsofayan YM., *et al*. "Clinical characteristics of COVID-19 in Saudi Arabia: a national retrospective study". *Journal of Infection and Public Health* (2020): S1876-0341 (20): 30492-5.
10. Sardu C., *et al*. "Impact of diabetes mellitus on clinical outcomes in patients afected by Covid-19". *Cardiovascular Diabetology* 19.1 (2020): 76.
11. Wu Z and McGoogan JM. "Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72314 cases from the Chinese Center for Disease Control and Prevention". *JAMA* 323.13 (2020): 1239-1242.
12. Reynolds HR., *et al*. "Renin-angiotensinaldosterone system inhibitors and risk of Covid-19". *The New England Journal of Medicine* 382.25 (2020): 2441-2448.
13. Saavedra JM. "Angiotensin receptor blockers and COVID-19". *Pharmacology Research* 156 (2020): 104832.
14. Schnell O., *et al*. "Report from the 4th Cardiovascular Outcome Trial (CVOT) Summit of the Diabetes and Cardiovascular Disease (D&CVD) EASD Study Group". *Cardiovascular Diabetology* 18.1 (2019): 30.
15. Habibi J., *et al*. "The combination of a neprilysin inhibitor (sacubitril) and angiotensin-II receptor blocker (valsartan) attenuates glomerular and tubular injury in the Zucker Obese rat". *Cardiovascular Diabetology* 18.1 (2019): 40.
16. Al-Daghri NM., *et al*. "Diabetes mellitus type 2 and other chronic noncommunicable diseases in the central region,

Saudi Arabia (Riyadh cohort 2): a decade of an epidemic". *BMC Medicine* 9 (2011): 76.

17. Hussain S., *et al*. "Burden of diabetes mellitus and its impact on COVID-19 patients: a meta-analysis of real-world evidence". *Diabetes and Metabolic Syndrome* 14.6 (2020): 1595-602.

18. Caballero AE., *et al*. "COVID-19 in people living with diabetes: an international consensus". *Journal of Diabetes Complications* 34.9 (2020): 107671.

19. Mokdad AH., *et al*. "When chronic conditions become acute: prevention and control of chronic diseases and adverse health outcomes during natural disasters". *Preventing Chronic Disease* 2 (2005): A04.

20. ML Holshue., *et al*. "First case of 2019 novel coronavirus in the United States". *The New England Journal of Medicine* 382 (2020): 929-936.

21. VK Derebail and RJ Falk. "ANCA-associated vasculitis—refining therapy with plasma exchange and glucocorticoids". *Massachusetts Medical Society* (2020).

22. Peeri NC., *et al*. "The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned?" *International Journal of Epidemiology* 49.3 (2020).

23. Organization WH. Rational use of personal protective equipment for coronavirus disease (COVID-19): interim guidance, 27 February 2020. World Health Organization (2020).

24. "Laboratory testing for coronavirus disease (COVID-19) in suspected human cases". WHO (2020).

25. To KK., *et al*. "Temporal profiles of viral load in posterior oropharyngeal saliva samples and serum antibody responses during infection by SARS-CoV-2: an observational cohort study". *Lancet Infectious Disease* 20.5 (2020): 565-574.

26. European Centre for Disease Prevention and Control. An overview of the rapid test situation for COVID-19 diagnosis in the EU/EEA. Stockholm: ECDC (2020).

27. Yang T., *et al*. "Point-of-Care RNA-based diagnostic device for COVID-19". *Diagnostics* 10.3 (2020): 165.

28. UJ Kim., *et al*. "Combination therapy with lopinavir/ritonavir, ribavirin and interferon-α for Middle East respiratory syndrome". *Antivirus Therapy (Lond)* 21 (2016): 455-459.

29. E de Wit., *et al*. "Prophylactic and therapeutic remdesivir (GS-5734) treatment in the rhesus macaque model of MERS-CoV infection". *Proceedings of the National Academy of Sciences of the United States of America* 117 (2020): 6771-6776.

30. P Colson., *et al*. "Chloroquine and hydroxychloroquine as available weapons to fight COVID-19". *International Journal of Antimicrobial Agents* 55.4 (2020): 105932.

31. F Zaragozá García and M Ibarra Lorente. "Interferon beta as a therapy for múltiple sclerosis". *Farmacia Hospitalaria* 26 (2002): 294-301.

32. Villar C Ferrando., *et al*. "Dexamethasone treatment for the acute respiratory distress syndrome: a multicentre, randomised controlled trial". *Lancet Respiratory Medicine* 8 (2020): 267-276.

33. Y Zhou., *et al*. "Aberrant pathogenic GM-CSF + T cells and inflammatory CD14 + CD16 + monocytes in severe pulmonary syndrome patients of a new coronavirus". *Immunology* (2020).

34. A García Roche., *et al*. "Cytokine release syndrome. Reviewing a new entity in the intensive care unit". *Medicina Intensiva* 43 (2019): 480-488.

35. CC Lu., *et al*. "Potential therapeutic agents against COVID-19: What we know so far". *Journal of the Chinese Medical Association* 83.6 (2020): 534-536.

36. EG Favalli., *et al*. "Baricitinib for COVID-19: a suitable treatment?". *Lancet Infectious Disease* (2020).

37. L Adam Monteagudo., *et al*. "Continuous Intravenous Anakinra Infusion to Calm the Cytokine Storm in Macrophage Activation Syndrome". *ACR Open Rheumatology* 2.5 (2020): 276-282.

38. G Gritti., *et al*. "Use of siltuximab in patients with COVID-19 pneumonia requiring ventilatory support". *Respiratory Medicine* (2020).

39. L Li., *et al*. "Effect of Convalescent Plasma Therapy on Time to Clinical Improvement in Patients With Severe and Life-threat-

ening COVID-19: A Randomized Clinical Trial". *JAMA* 324.5 (2020): 460-470.

40. W Cao., *et al*. "High-Dose Intravenous Immunoglobulin as a Therapeutic Option for Deteriorating Patients With Coronavirus Disease 2019". *Open Forum Infectious Diseases* 7 (2020).

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