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REVIEW ARTICLE

COVID-19: Accident or plan

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ABSTRACT

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. It affected all over the world population to large extent. It becomes the topic of discussion as the accident or plan. In this communication, author tried to cover all the aspects about COVID-19, its history, facts, its symptoms, precautions, treatment, and natural remedies.

KEY WORDS: Coronavirus disease, Precautions, Remedies, Symptoms and treatment

INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. This is declared as a pandemic disease by the government authority World Health Organization (WHO). The WHO is leading and coordinating the global effort, supporting countries to prevent, detect, and respond to the pandemic.[1] Globally, the world is going through a sudden outbreak of corona virus, infecting the people of every age. COVID-19 is a respiratory infection caused by the severe acute respiratory syndrome coronavirus 2 (SARS-cov-2) virus and the symptoms include – fever, cold, dry cough, shortness of breath, fatigue, and body aches that usually appears in 2–14 days after exposure to the infection. Facing this crisis, COVID-19 cures might already exist in old drugs but till then we have to stop its spreading.[2]

Most people infected with the COVID-19 virus will experience mild-to-moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.[3]

The best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol based rub frequently and not touching your face.

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The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it is important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow).[4]

At this time, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments. The WHO will continue to provide updated information as soon as clinical findings become available.[5]

HISTORY

COVID-19 pandemic is accident or plan, so the author would like to discuss the facts in details as given below:

There are numerous experiments for laboratory incidents leading to isolated infections and transient transmission chains, including SARS-CoV. However, with the exception of Marburg virus, all documented laboratory escapes have been of readily identifiable viruses capable of human infection and associated with sustained work in high titer cultures.[3] The 1977 A/H1N1 influenza pandemic, that most likely originated from a large-scale vaccine challenge

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trial is the only documented example of a human epidemic or pandemic resulting from research activity. No epidemic has been caused by the escape of a novel virus, and there is no data to suggest that the WIV – or any other laboratory – was working on SARS-CoV-2, or any virus close enough to be the progenitor, before the COVID-19 pandemic.[6] Viral genomic sequencing without cell culture, which was routinely performed at the WIV, represents a negligible risk, because viruses are inactivated during RNA extraction. No case of laboratory escape has been documented following the sequencing of viral samples.[7]

Known laboratory outbreaks have been traced to both workplace and family contacts of index cases and to the laboratory of origin. Despite extensive contact tracing of early cases during the COVID-19 pandemic, there have been no reported cases related to any laboratory staff at the WIV, and all staff in the laboratory of Dr. Shi Zhengli were said to be seronegative for SARS-CoV-2 when tested in March 2020, with the laboratory reportedly following the appropriate biosafety protocols during their coronavirus work.[8] During a period of high influenza transmission and other respiratory virus circulation, reports of illnesses would need to be confirmed as caused by SARSCoV-2 to be relevant. Epidemiological modeling suggests that the number of hypothetical cases needed to result in multiple hospitalized COVID-19 patients before December 2019 is incompatible with observed clinical, genomic, and epidemiological data.[9]

The WIV possesses an extensive catalog of samples derived from bats and has reportedly successfully cultured three SARSr-CoVs from bats-WIV1, WIV16, and Rs4874. Importantly, all three viruses are more closely related to SARS-CoV than to SARS-CoV-2. Around two-thirds of Americans (64%) say that China has done a bad job dealing with the coronavirus outbreak. Around three-quarters (78%) place a great deal or fair amount of the blame for the global spread of the coronavirus on the Chinese government's initial handling of the COVID-19 outbreak in Wuhan.[10] More generally, Americans see Sino-U.S. relations in bleak terms. Around seven-in-ten (68%) say that current economic ties between the superpowers are in bad shape – up 15% points since May 2019, a time in the trade war when tariffs were ramping up. Around one-in-four (26%) also describe China as an enemy of the United States – almost double the share who said this when the question was last asked in 2012.[11]

HOW DOES VIRUS SPREAD??

As we know, virus is an infectious agent that replicates only inside the living cells of an organism and described as "Organisms at the edge of the life." Virus also contains genes, but they do not have the cellular structure, which is the basic unit of life. Therefore, they cannot naturally reproduce outside a host cell. Their only desire is for living being.[11]

- If a person can get COVID-19 by touching a surface or object that has virus on it and touch their own mouth and eyes they got easily affected as viruses live on these surfaces also but has less life as compared to a living being.
- People are thought to be most contagious when they are most symptomatic or sickest.
- The virus can be spread through droplets from infected persons coughing or sneezing, and through contact with surfaces that have the virus containing droplets on them.[12]

These viruses can be spread through – as in case of corona virus

- Respiratory transmission
- Contact transmission.

To avoid spreading we must follow following points

- Wash and sanitize your hands frequently
- Do not touch your face with unwashed hands
- Dispose of tissue after one use
- If you cough or sneeze, do so into your elbow
- Distance yourself from infectious persons
- Regularly disinfect surfaces and items you might touch every day
- Self-isolate yourself in your homes
- Stay home, Stay healthy.[13]

HOW COVID-19 AFFECTS THE BODY?

Across the world, people are being affected day by day from the corona virus which ultimately gave rise to morbidity and mortality rates among the Nation.

In phase I

- The novel virus corona assault begins in the nose
- It invades mainly the epithelial cells of the respiratory tract
- If virus moves down to the respiratory tree and the lungs, disease can get more severe and lead to pneumonia.[14]

In phase II

- It causes damage to the epithelium lining of the trachea and bronchi could result in loss of mucus productive cells that protects our lungs.
- Lungs become vulnerable to viral infection and becomes to week that are impaired to work, starving vital organs of oxygen.
- Living beings that immune system plays the significant role that may help to cure corona virus.

- However, in case, immune system is not strong enough against the virus, there could be large scale destruction of not just virus infected cells but also the healthy ones.[15]

What are the natural remedies to fight against COVID-19?

- The crucial factor is to maintain the immune system strong so that it became a barrier against corona
- Get plenty of fluids
- Intake of vitamin C and fruits rich in vitamin C makes your immune system strong
- Do some yoga and exercises during your routine
- Excess intake of water
- Indulge in the physical and social activities with your family
- Moral and mental support is the basic necessity.[16]

How much of vitamin C is required on daily basis for every age?

Average daily recommended amounts for different ages are listed below in milligrams (mg).

Age	Daily requirement
Birth to 6 months	40 mg
Infants 7–12 months	50 mg
Children 1–3 years	15 mg
Children 4–13 years	25 mg
Teens 14–18 years (boys)	75 mg
Teens 14–18 years (girls)	65 mg
Adults (men)	90 mg
Adults (women)	75 mg
Pregnant women	85 mg
Breastfeeding women	120 mg

Sources of vitamin

Fruits and vegetables are the best sources of vitamin C. You can get recommended amounts of vitamin C by eating a variety of foods including the following:

- Citrus fruits (such as oranges and grapefruit) and their juices, as well as red and green pepper and kiwifruit, which have a lot of vitamin C.
- Other fruits and vegetables – such as broccoli, strawberries, cantaloupe, baked potatoes, and tomatoes – which also have vitamin C.

The vitamin C content of food may be reduced by prolonged storage and by cooking. Steaming or microwaving may lessen cooking losses. Fortunately, many of the best food sources of vitamin C, such as fruits and vegetables, are usually eaten raw.[15]

At present, there are no approved treatments and cure for the prevention of COVID-19. There has been keen interest in repurposing existing drugs and developmental antiviral treatments as such used for HIV, AIDS, influenza, hepatitis, and Ebola virus. We need diagnostic to detect and limit the spread of corona virus, vaccines for the long-term protection, treatments to save lives in short-term.[16]

TREATMENT OPTIONS UNDER THE CLINICAL TRIAL

Antiviral treatments

Many studies have focused on repurposing established antiviral therapies, especially those that showed prior efficacy against SARS-CoV and MERS-CoV.

Mechanisms may include inhibition of viral enzymes or processes such as viral DNA and RNA polymerase, viral protein, virus assembly, new virus particle transport, and virus release.

i. Lopinavir/Ritonavir combination is the most common exploratory antiviral. *In vitro* and animal model studies show potential activity for other coronaviruses (SARS-CoV). Lopinavir and ritonavir may bind to Mpro, a key enzyme for coronavirus replication. This may suppress coronavirus activity.[17]
ii. Remdesivir is a novel nucleotide analogue antiviral initially developed for the management of the Ebola and Marburg viruses. Remdesivir is a mono phosphoramidate Prodrug of remdesivir triphosphate, an adenosine analog that acts as an inhibitor of RNA-dependent RNA polymerases. Remdesivir-TP competes with adenosine-triphosphate for incorporation into nascent viral RNA chain. However, it has efficacy against a broad range of pathogenic viruses, including both SARS-CoV and MERS-CoV in *in vitro* and *in vivo* models. There has been much interest in this molecule, following treatment of the first COVID-19 case and subsequent recovery in the United States of America.
iii. Favipiravir is a broad-spectrum antiviral with *in vitro* activity against RNA viruses. Favipiravir is an RNA-dependent RNA polymerase inhibitor that inhibits viral RNA synthesis.[18]

Antimalarial treatments

Chloroquine and hydroxychloroquine

Antimalarial, chloroquine, was found to have significant inhibitory effects on viral cell entry and replication *in vitro*. An early report of clinical experience in 100 patients with COVID-19 reported both beneficial clinical and virologic outcomes with chloroquine treatment. Hydroxychloroquine has *in vitro* activity against SARS-CoV-2 and may have immunomodulating properties. One *in vitro* study suggests that hydroxychloroquine may be more potent than chloroquine.[17]

Immunosuppressants/immunomodulator

There is evidence that a hyper inflammatory response significantly contributes to mortality in COVID-19 infections. Corticosteroids were previously trialed in SARS-CoV; however, the results were inconclusive and adverse effects were associated.

Seven registered studies are evaluating the effect of corticosteroids in COVID-19. There is also interest in the anti-interleukin-6 (IL-6) drug, tocilizumab (used in treatment of rheumatoid arthritis, with seven registered trials. Other immunosuppressant's being investigated includes adalimumab (anti-TNF), eculizumab (anti-C5), and sarilumab (anti-IL-6), ixekizumab (anti-17A), and fingolimod (sphingosine 1-phosphate receptor modulator), used in multiple sclerosis.

I. Azithromycin is an anti-bacterial drug. It may prevent bacterial super infection, and macrolides may have immunomodulators properties to work as adjunct therapy. Immunomodulatory mechanisms may include reducing chemotaxis of neutrophils to the lungs by inhibiting cytokines, inhibition of mucus hyper secretion, decreased production of reactive oxygen species, accelerating neutrophil apoptosis, and blocking the activation of nuclear transcription factors.[18]
II. Tocilizumab is an IL-6 receptor-inhibiting monoclonal antibody. Tocilizumab inhibits IL-6-mediated signaling by competitively binding to both soluble and membrane-bound IL-6 receptors. IL-6 is a proinflammatory cytokine that is involved in diverse physiological processes such as T-cell activation and immunoglobulin secretion induction.
III. Sarilumab is an IL-6 receptor-inhibiting monoclonal antibody. Cytokine release syndrome may be a component of severe disease in COVID-19 patients.[18]

COVID-19 convalescent plasma therapy

- Plasma collected from persons who have recovered from COVID-19 that may contain antibodies to SARS-CoV-2. Clinical trials are being conducted to evaluate the use of COVID-19 convalescent plasma to treat patients with severe or immediately life-threatening COVID-19 infections.
- Hyperimmune – The hyperimmunes are polyclonal antibodies derived from plasma, which are capable of generating an immune response and protecting against infection. Product candidate derived from human plasma is named COVID-HIG, while COVID-EIG is derived from equine plasma. Both will be explored for the treatment of patients with a severe case of infection.[18]

Vaccines

- Linear DNA vaccine – The linear DNA vaccine as a treatment for coronavirus. This polymerase chain reaction (PCR) was used for manufacturing DNA vaccine to develop. The PCR technology offers several advantages including high purity, increased production speed, and absence of antibiotics and bacterial contaminants. Further, the vaccine gene developed through this technology can be effective without being inserted into the patient's genome. The design for four DNA vaccine candidates is expected to be produced using the PCR technology for carrying out animal testing. The design of one of the vaccine candidates is based on the entire spike gene of the coronavirus, while the remaining is designed based on the antigenic portions of the protein.[19]
- mRNA-1273 vaccine – The vaccine targets the Spike (S) protein of the coronavirus.

- Fusogenix DNA vaccine – It is developed using the Fusogenix drug delivery platform to prevent COVID-19 infections. Fusogenix drug delivery platform is a proteo-lipid vehicle that introduces genetic payload directly into the cells. Entos is working on developing an optimized payload containing multiple protein epitopes derived from SARS-COV-2 proteins, which will stimulate an immune response in the body to prevent COVID-19 infection.[20]

CONCLUSION

COVID-19 is found to be grave disease that can be treated by paracetamol along with the antibiotics. Natural products may be helpful to increase the immunity of the patients. In this review paper, the author compiles the history, prevention, and treatment approaches of COVID-19.

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