

CHAPTER-28

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ADMINISTRATION OF CURRENT MEDICINE AGAINST COVID-19

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The emergence of novel corona virus (COVID-19) has resulted a state of emergency across the globe. The situation has hampered the global health care sector with limited or no choice of drugs to combat the current scenario. WHO and other governing agencies are tapping the scientific resources to come up with best possible solution and medication. Based on which the present chapter has been executed to highlight the drugs and therapeutics as first line of defense against the COVID-19. The chapter also highlights on the attempts of developing vaccine against this pandemic crisis.

I. Introduction

The COVID-19 or coronavirus pandemic is defining the world health crisis of this time and the biggest challenge population has faced since world war 2. Since its disclosure in Asia late last year, the virus has outspread to every continent except Antarctica. But pandemic is more than a health crisis, it is also an unprecedented socio-economic crisis. Everyone is stressing and the country touches, it can create destructive social, political effects, and economics which will leave huge and long-standing scars. First human cases of COVID-19, the disease caused through the novel Coronavirus causing COVID-19, called

SARS-CoV-2 were firstly found out officially in Wuhan city, China, in the year December 2019 [1]. The symptoms of COVID-19 are myriad. Most infected people will develop themselves mild to moderate illness and get recovery without any treatment or hospitalization. Some of the common symptoms includes Dry cough, Fever, Tiredness, Sore throat, Diarrhea, Headache, Aches and pains, , Conjunctivitis, Not getting the test or smell or rash on the skin, or discoloration of the fingers or toes. During serious implications patients have witnessed difficulty in breathing or breath shortness, Chest pain or pressure loss of the speech or movement. The symptoms may vary depending upon the degree of infection. Once you encounter the infection, within 14 days you are expected to get symptoms depending upon the immune response of the individual.

2. Medicine used during COVID-19

Till date, there is no exact medication available for the COVID-19 infection, as there is alarming rate of mortality and morbidity, the WHO and the governing agencies have come up with the administration of approved drugs which may suppress the infection and act in management of this pandemic situation. As of now, there are temporary/interim approval of reported drugs for immediate use which are being discussed in the following section. The FDA has been granted immediate utilization of the antiviral drug remdesivir to treat the COVID-19. The US national institutes of the health just now recommended the corticosteroid dexamethasone for the persons with severe COVID-19 and need supplemental mechanical ventilation or oxygen. Currently, no medicine or vaccine is available for the treatment of the COVID-19 and no cure is available. Antibiotics aren't impacting against viral infections like COVID-19. Doctors or researchers are testing many possible treatments [1]. Encouraging care is aimed at mitigating symptoms and also may include Pain relievers (ibuprofen or acetaminophen), Cough syrup or medication, Fluid intake . But there is no proof that ibuprofen or other nonsteroidal anti-inflammatory drugs (NSAIDs) require to be ignored. The first coronavirus vaccine in china is expected to ready for the clinical trials by the last of the April month, according to the Xu Nanping, vice-minister of science and technology of china. Inovio pharmaceuticals plan to start the clinical trials on the vaccine of the coronavirus in the April month this year. Health officials

from the WHO have been noted that Gilead's remdesivir has been exhibited effectiveness in treating coronavirus infection.

3. US FDA approved chloroquine for emergency use for COVID-19

The US food and drug administration (FDA), has been approved bounded emergency utilization of the chloroquine and hydroxychloroquine as the treatment of the COVID-19. US President Donald Trump had announced on 19th March, that hydroxychloroquine/Plaquenil and chloroquine utilized to treat arthritis and malaria were accepted through FDA to be tested as the COVID-19 treatment. Chloroquine is also being tested in different clinical trials that are done by government agencies and academic institutions. Other types of antiviral drugs are also made to be fast-tracked for the testing for the COVID-19.

4. The drug used in china Favilavir

In China, the national medical products administration has been approved the utilization of the Favilavir, which is an antiviral drug, as a drug for the treatment of coronavirus. This drug has been reportedly seen efficacy for treating the disease with the minimum side effects in clinical trials including 70 patients. This clinical trial is being done in Shenzhen, Guangdong province.

5. Pharmaceutical organizations involved in making COVID-19 vaccines/drugs

Here is a list of main coronavirus drugs that pharmaceutical companies over the world are making that have been possible to become the main coronavirus vaccine or antivirals for treating communicable coronavirus infections. Vaccines are listed below are the coronavirus vaccines in different stages of the development, over the world.

- ***Fusogenix DNA vaccine through Entos pharmaceuticals***

Entos pharmaceuticals are making Fusogenix DNA vaccine made utilizing the Fusogenix drug transportation platform to avert COVID-19 infections. Its delivery platform is the proteolipid vehicle which addresses genetic payload straightly into human cells. Entos is performing on making a developed payload holding many protein epitopes that are derived from SARS-COV-2 proteins, this will stimulate an immune response in the body to stop COVID-19 infection [2].

- ***ChAdOx1 nCoV-19 through the university of oxford***

Oxford university ChAdOx1 nCoV-19 is an adenovirus vaccine vector made by Jenner's institute university. University is a testing vaccine in the clinical trial and planned to be conducted in the Thames Valley Region. And Approximately 510 participants their age is between 18 to 55 years will be selected fro the vaccine trial or future study.

- ***Gimsilumab through Roivant sciences***

Roivant Sciences is providing development of the Gimsilumab at a clinical-stage, human monoclonal antibody. The drug targets granilocyte-macrophage colony factor is related to stimulating (GM-CSF), this is a pro-inflammatory cytokine that got at a high level in serum of the COVID-19 patients. Targeting GM-CSF is also expected to remove the damage of the lung and also reduce the mortality rate in COVID-19 patients.

- ***AdCOVID through Altimune***

Altimune has cooperated with the University of Alabama at Birmingham (UAB) to make a single dose of an intranasal vaccine to COVID-19 called AdCOVID. The organization is presently bringing out immunogenicity after the studies, that stage one clinical trial material will be made. UAB and Altimune will work and researchers conduct a preclinical study of animal and stage one clinical trial in the year of the third quarter of the 2020 [2].

- ***TJM2 through the I-MAB biopharma***

I-Mab biopharma is made TJM2, this is a neutralizing antibody, and a treatment for cytokine storm in the patients who are suffering from a serious case of coronavirus infections. This medicine targets human granulocyte-macrophage colony-stimulating factor (GM-CSF), this is responsible for acute and chronic inflammation. The organization will begin development after getting approval of the investigational new drug (IND) applications from the US FDA (Food and drug administration).

- ***The vaccine of coronavirus by Medicago***

Medicago is making drug candidates against COVID-19. After producing virus-like particles (VLP) of the coronavirus. The organization has been making cooperation with the Laval university's infectious disease research center to develop antibodies at odds with the SARS-CoV-2. Organizations' research activity is being partially capitalized by the Canadian institutes to health research (CIHR).

- ***AT-100 through airway therapeutics***

Airway Therapeutics is traversing its noble human recombinant protein called AT-100 (rhSP-D) for coronavirus treatment. The organization has also announced a filling with respiratory disease branch for the national institute of health to assess drugs. AT-100 has been seen efficacy in the preclinical study in removing infection and inflammation in the lungs when also developing an immune response against the different respiratory diseases.

- ***TZLS-501 through Tiziana life sciences***

Tiziana life sciences are developing their monoclonal antibody called TZLS-501 to the treatment of the COVID-19. TZLS-501 is a human anti-interleukin-6 receptor (IL-6R), that helps to stop the damage of lungs and raised levels of IL-6. The medicine works through combined with the IL-6R and consuming the amount of IL-6 circulating in the body thus removing chronic lung swelling.

- ***OYAI by OyaGen***

OYAI OyaGen's has been providing strong efficacy against COVID-19 patients in laboratory essays. And it was more effective than the chlorpromazine HCl in the inhibiting SARS-CoV-2 from the copying in the human cell culture. OYAI was approved earlier as a new investigational drug for cancer treatment however forsaken due to the lack of efficacy. And OYAGEN conducts further research on medicine to fix the efficacy of coronavirus treatment.

- ***BPI-002 through BeyondSpring***

BPI-002 BeyondSpring is a tiny molecule agent designated for the treatment of different infections involving COVID-19. This can activate in body CD4+ helper T

cells and CD8+ cytotoxic T cells and developing an immune system in the human body. If this combined with the other COVID-19 vaccine, this medicine can create long-duration protection against viral infections. This has filed US patent from the protection for drug treatment from the viral infections.

- ***Altimune intranasal corona virus vaccine***

Altimune is the US-based company developed an intranasal COVID-19 vaccine by the biopharmaceutical company. Synthesis and design of a single dose vaccine have been made complete and will follow animal testing. The vaccine of the coronavirus is being made which is based on the vaccine technology platform which is the same as the NasoVAX, and this an influenza vaccine that is made by the Altimune.

- ***INO-4800 through Inovio pharmaceutical and Beijing Advaccine biotechnology***

Inovio pharmaceutical has cooperated with the Beijing Advaccine biotechnology organization to innovative development of former's vaccine, INO-4800, which is a novel vaccine for the coronavirus. The organization has been beginning preclinical testing for the manufacturing clinical product. This vaccine development is kept up a \$ 9 mallow from Coalition for the preparedness innovations (CEPI). The company announced an advanced timeline for the development of vaccines on 3rd march. Trails are running and design for the human clinical trial has been done. The organization has been also made 3000 doses for the human clinical trials that are planned to be done over the US, South Korea, and China. Plans are developed for large scale manufacturing [3]. Human-based clinical trials are in the 30 healthy participants are expected to start in April 2020 in the US, South Korea, and China. A stage of one clinical trial is done to be n parallel china, through Beijing Advaccine. outcomes from clinical trials are awaited to be accessible in 2020 September. Inovio purposes to develop 1 million vaccine doses through the last of 2020 to done additional emergency use or clinical trials.

- ***NP-120 through Algernon pharmaceuticals (Ifenprodil)***

Algernon pharmaceutical has been announced which is traversing its NP-120 (Ifenprodil) as a possible COVID-19 treatment. Ifenprodil is an N-methyl-d-aspartate (NDMA) contact glutamate contact antagonist sold under the name of brand Cerocal. It has been displayed efficacy for increasing stamina in the mice infected with the H5N1.

- ***APNOI through the university of the British Columbia and APEIRON biologics***

A medicine candidate made by the APEIRON biologics called APNOI is being tested in China in a stage I pilot trial as the COVID- 19 treatment. APNOI is researched by the professor at the University of British Columbia for the treatment of SARS. Research is disclosed in which the ACE2 protein was the main contact for the SARS virus. Clinical trials will be tested medicine's efficacy in removing viral load in patients. Data on the trail will be utilized to fix if more clinical trials are needed to be done in a huge number of patients.

- ***mRNA-1273 vaccine through Moderna and vaccine research center***

A unit of the national institute of the allergy and infectious diseases (NIAID), Moderna, and vaccine research center, have been cooperated to make a vaccine for the treatment of the coronavirus. This vaccine target spike (S) protein for the coronavirus. First trials of vaccines have been made at the Moderna's Massachusetts manufacturing plant and shipped to NIAID for the stage I human trial. The trail started on the 16th March at the Kaiser Permanente Washington health research institute in Seattle, Washington. Approximate 45 males and females, they're aged between 18 to 455 have been selected fro the trial. The volunteers will be partitioned into 3 units those will be administered 25 mCG, 100 mcg, or 250 mcg (microgram) dose for 28 days.

- ***Avian Coronavirus infectious bronchitis virus (IBV) vaccine through MIGAL research institute***

MIGAL research institute in Israel told that an infectious bronchitis virus (IBV) vaccine is made to provide treatment avian coronavirus has been changed to treat COVID-19. The vaccine has been displayed efficacy in the pre-clinical trials done by

Volcani institute [3]. The IBV vaccine was made after 4 years of the research and has a higher genetic similarity for the human coronavirus. And the institute has been genetically changed vaccine for treatment COVID-19 and will be in the market in oral form.

6. The future prospective

The world is in race of coming up with novel vaccine, technology and drugs to combat COVID-19 but as of now, no concrete evidence is available to elucidate the exact drug or medication against this pandemic crisis. May be in near future, scientific communities are hoping to give positive response in controlling the spread of COVID-19 [4].

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