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Review Article

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Novel Corona Virus-Covid -19, current treatment of future use of Medicinal plants and Plasma therapy in minimizing pandemic threat -A brief Review.

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Abstract

The Novel Corona virus is spherical or somewhat pleomorphic in shape. The genetic material of this virus is single stranded RNA. It is enveloped by club shaped glycoprotein. Corona viruses showed distinctive morphology under transmission Electron Microscope (TEM). The name being derived from the outer fringe it similar to crown shaped structure. The is Latin word meaning crown, corona‖ of embedded enveloped protein possessed by covid-19. It is the member of the family *Coronaviridae* cause a broad spectrum of respiratory infection in animal and human. Human Coronavirus (HCoV) infection causes respiratory diseases with mild to severe outcomes. Few years before, we also have witnessed for emergence of two zoonotic and highly pathogenic.

It also causes severe acute respiratory syndrome coronavirus, i.e. SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV). The antimalerial drugs Hydroxychloroquine and chloroquine have been proved as potential "game-changers" in the present situation for COVID-19. There is alarming need to investigate vaccine against this virus. There were some reports on use of some medicinal plants as a antiviral drugs. The some medicinal plants have saponin as a biomolecules, which act against viral infection. This review also focus on Plasma Therapy which might prove to be blessing against Covid-19.We performed a review article to describe existing literature available with regard to Corona Virus Disease, 2019 (COVID-19) and our conclusion with future perspective.

Keywords: Covid-19, ss-RNA, Hydrxychloroquine, Chloroquine, Paper strip kit, pandemic, medicinal plants, biomolecules, Plasmatherapy.

Introduction

The Corona viruses have large family of viruses that can infect birds, animals including humans. The SARS virus is of same family, it was responsible for outbreaks of severe acute respiratory syndrome (SARS) pandemic of 2002-2003. In South Korea, the Middle East respiratory syndrome (MERS) outbreak was reported in 2015. Now in present situation a novel coronavirus (SARS-CoV-2, also known as COVID-19) triggered horrible outbreak in all over world, WHO declared it as a pandemic. The first corona patient was found on December 2019,in Wuhan of China. Although many details about the emergence of this virus, like its origin, drugs, vaccines and ability to spread among humans remain unknown still date.

An increasing number of cases appear to have resulted from human-to-human transmission proved by the international travel history of peoples. The severe acute respiratory syndrome coronavirus (SARS-CoV) outbreak in 2002 and the Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak in 2015, The third is the covid-19, coronavirus to emerge in the human an emergence that has put global public health institutions on high alert. In December 31, 2019, hospitals reported a cluster of cases with unknown cause of pneumonia in China, Wuhan. On January 1, 2020, Wuhan public health authorities shut down Seafood Wholesale Market, where wild and live animals were sold, due to a suspected link with the outbreak. On January 7, 2020, researchers rapidly isolated a novel coronavirus (SARS-CoV-2, also referred to as 2019-nCoV). from confirmed infected pneumonia patients.

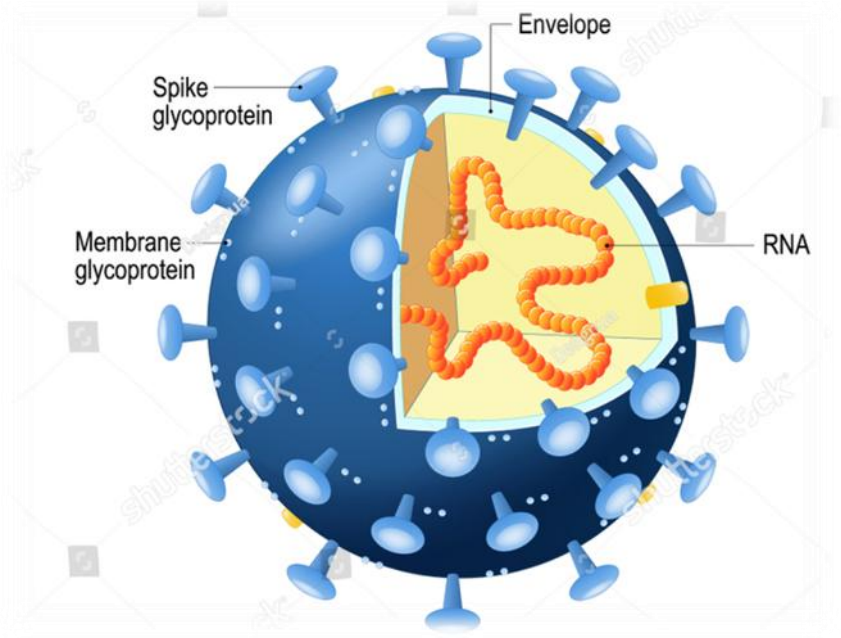

Image-1. Structure of Covid-19.

The first report of the novel coronavirus, SARS-CoV-2, causing coronavirus disease 2019 (COVID-19) originated in Wuhan, China, in early December 2019. Since then, the virus has spread across national borders, now affecting more than 200 countries and territories, with over 1 million confirmed cases and 56,000 confirmed deaths as of April 4th, 2020. (Wang *et al*., 2020). Several countries in the region as well as the United States are screening travelers from Wuhan for fever, aiming to detect 2019-nCoV cases before the virus spreads further.

On January 22, 2020, novel Co-V has been declared be originated from wild bats and belonged to Group 2 of beta-coronavirus that contains Severe Acute Respiratory Syndrome Associated Coronavirus (SARS-CoV). Although COVID-19 and SARS-CoV belong to the same beta corona virüs subgroup, similarity at genome level is only 70%, and the novel group has been found to show genetic differences from SARS-CoV. Similar to the SARS epidemic, this outbreak has occurred during the Spring Festival in China, which is the most famous traditional festival in China. Similarly, there was a rapid increase in COVID-19 cases between January 10-22. Wuhan, the center of the epidemic with 10 million population, is also an important center in the spring festival transportation network. (Shrikrushna *et al.,* 2020).

Coronaviruses belongs to subfamily Coronavirinae and Coronaviridae family. It has seven different types of strains. The names are 229E (alpha coronavirus), NL63 (alpha coronavirus) , OC43 (beta coronavirus) ,HKU1 (beta coronavirus), and most severe respiratory infections caused by MERS-CoV, SARS-CoV, Currently most dangerous and pandemic new strain called SARS-CoV-2 started circulating and causing the death, disease COVID-19.

Firstly fact of COVID-19 was linked to an animal and seafood market. This fact suggested that animals initially transmitted the virus to humans. However, people with a more recent diagnosis had no connections with or exposure to the market, confirming that humans can pass the virus to each other. During the past 3 weeks, new major epidemic foci of coronavirus disease 2019 (COVID-19. In the middle of March number of cases of COVID-19 outside China had increased drastically and the number of affected countries, states, or territories reporting infections to WHO was 143.1 On the basis of ”alarming levels of spread and severity, and by the alarming levels of inaction”, on March 11, 2020, the Director-General of WHO characterized the COVID-19 situation as a pandemic.(WHO, 2020).

The clinical spectrum of COVID-19 varies from asymptomatic or paucisymptomatic forms to clinical conditions characterized by severe respiratory failure that necessitates mechanical ventilation and support in an intensive care unit (ICU), to multiorgan and systemic manifestations in terms of sepsis, septic shock, and multiple organ dysfunction syndromes (MODS) (Lupia, *et al.,*2020) There are no specific clinical features that can yet reliably distinguish COVID-19 from other viral respiratory infections. Other, less common symptoms have included headaches, sore throat, and rhinorrhea. In addition to respiratory symptoms, gastrointestinal symptoms (e.g., nausea and diarrhea) have also been reported, and in some patients they may be the presenting complaint. Respiratory droplet transmission is the main route and it can also be transmitted through person-to-person contacts by asymptomatic carriers (Yang *et al.,* 2020).

The Transmission of Covid-19

The corovid-19 virus can spreading through Coughing and sneezing, so the person should cover the mouth with handkerchief, bend elbow and must to use masks and gloves ,because droplets disperse into the air and infect healthy person. Avoid Touching or shaking hands with a person and should maintain social distancing of about two meter distance. The contact with a surface or any object that has the virus and then touching the nose, eyes, or mouth .The National Institutes of Health (NIH) suggest that several groups of people have the highest risk of developing complications due to COVID-19. The Young children, People aged 60 years or older and pregnant women have mostly risk of infection.

The only step to remain away from infection is social distancing, personal hygiene, washing hands with soap and use of sanitizers frequently. The vaccine is not available on this infection. Bat coronavirus positivity in bat specimens screened using RNA‐dependent RNA polymerase (*RdRp*) gene‐specific reverse transcription‐polymerase

chain reaction (RT‑PCR) in different States *Pteropus* bats and *Rousettus* bats samples of rectal and throat swab tested and Kerala collected bats were found to be positive in both samples. (Pragya Yadav *et al.*,2020).

Common symptoms of Covid-19:- Cough, Fever, Runny nose, Watery diarrhea, sore throat, sneezing

Prevention strategies to minimize and avoid infection

Coronaviruses can mutate effectively, it has potential to change its genes to adopt accordingly, which makes them so contagious. To prevent transmission, people should stay at home and rest while symptoms are active. They should also avoid close contact with other people. Covering the mouth and nose with a tissue or handkerchief while coughing or sneezing can also help prevent transmission. It is important to dispose of any tissues after use and maintain hygiene around the home. Symptoms vary from person-to-person with COVID-19. It may produce few or no symptoms. However, it can also lead to severe illness and may be fatal. People can take several steps, includes Resting and avoiding over exertion and keep hydrating to body by drinking enough water.Person should avoid smoking and smoky areas and should practice yoga for making healthy lungs. There is also need to follow standard recommendations instructed by Government to prevent spread of infection. The gargling with warm water and drinking warm water also make relief at some few level. Avoid eating cold and refrigerated and stale food items. The spray of Sodium hypochloride using now as a disinfectant all everywhere.

Personal hygiene, include regular hand washing about 30seconds with hand wash or soap, it breaks membrane of glycoproteins and ultimately destroy virus structure. Covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs. Avoid close contact with anyone showing symptoms of respiratory tract infection and maintain social distancing. By considering threats of Covid-19, Govt. of India and other countries undertaken effective tool of lockdown to combat with corona. The individuals should keep themselves in quarantine for about 15 days after travel history of hot spot and places even though they seems asymptomatic.

Vaccines And Treatments and testing kits

Several efforts to develop vaccines are underway, but the WHO estimates it will take 18 months for the COVID-19 vaccines to be available. (Huaxia, 2020) at present, most treatment is symptomatic and supportive, though anti-inflammatory and antiviral treatments have been employed. Supportive treatment for complicated patients has included continuous renal replacement therapy (CRRT), invasive mechanical ventilation, and even extracorporeal membrane oxygenation (ECMO). No specific antiviral drugs have been confirmed effective. The first reported patient with 2019-nCoV infection in the USA was treated with remdesivir, (Holshue *et al.*, 2020) and others have used anti-retrovirals like ritonavir, with trials of both in progress. A recent study conducted by the “front-line” health care providers combating COVID-19 in Wuhan indicated that systemic corticosteroid treatment did not show significant benefit. (Kui L *et al.*,2020). Baricitinib has been suggested as a potential drug for the treatment in the hope that it might reduce the process of both virus invasion and inflammation.(Richardson et al.,2020). Hydrxychloroquine, Chloroquine, were also using recently against covid-19.

The Indian Institute of Technology (IIT), Delhi has recently developed a COVID-19 test kit and make available for testing of Kovid-19, it is affordable and low-cost diagnostics that could be used in large numbers reports by Professor of IIT-Delhi, V. Perumal while talking to ANI. The Indian Council of Medical Research (ICMR) apporaved it. It is only swab testing kit so it can give result within an hour. This kit has 100 per cent sensitivity and specificity so that India will not depend on other countries for testing kit. it does not require fluorescent probes and easily

scaled up. The IIT-Delhi proved as first academic institute which obtained approval of ICMR for a real-time PCR-based diagnostic testing assay

Plasma Therapy and Covid -19

Immune means "convalescent" plasma refers to plasma that is collected from individuals, following resolution of infection and development of antibodies. The Passive antibody therapy by transfusion of convalescent plasma can prevent clinical infection or blunt clinical severity in covid patients, with recent pathogen exposure. Antibody Plamsa therapy can also be used for treatment of patients who are already manifesting symptoms of varying severity. However, passive antibody therapy is most potent when administered prophylactically or used early later the onset of symptoms. (Casadevall et al., 1994; 2003). Recently Convalescent Plasma therapy is the ray of hope against the covid-19. In this therapy individual which was suffering from Covid-19 and cured from the infection produce antibody in their blood plasma and it act against antigens, to fight against the virus. But certain conditions are there regarding this therapy.

BCG and Covid-19

It was also possibility about the covid-19, that the person who have with BCG vaccination has greater effectiveness and immunity against Covid-19, but WHO says it may be but not sure.

Antiviral activity of Medicinal plants

The Dichloromethane fraction *Macaranga barteri* showed the most potent antiviral activity among the fractions, against three serotypes of enteroviruses (E7, E13 and E19). Echovirus 7;13; 19). Further research is in progress to isolate and elucidate the bioactive components that may be responsible for the antiviral activity of this plant and to determine its mechanism of action. (Omonike *et al.,* 2018). Clinical syndromes associated with infections by echoviruses include aseptic meningitis, encephalitis, ataxia, paralysis, Guillain-Barré syndrome, respiratory tract infection, diarrhoea, pericarditis, myocarditis and hepatic disorder, Echoviral infection, like other enteroviruses, occurs via faecal-oral route transmission(Abedi *et al.*,2015). Echoviruses (enteric cytopathic human orphan viruses) are also ss-RNA as genetic material as like Covid-19. Covid-19 is of zoonotic origin. In the last two decades, many viruses have been identified from bat species. Bats have been recognized as the natural reservoirs of a variety of pathogenic viruses such as Rabies, Hendra, Marburg, Nipah and Ebola viruses. Bats are known to harbour coronaviruses (CoVs) and serve as their reservoirs. Alpha-CoV (α-CoV) and beta-CoV (β-CoV) have been detected in bats in Asia, Europe, Africa, North and South America and Australasia. (Banerjee *et al*., 2019; Plowright *et al*., 2015; Wong *et al*.,2019).

It was reported that following Traditional Chinise Medicine herbal extracts had the capacity to inhibit the enzymatic activity of SARS. CLpro: Chinese *Rhubarb* extracts and water extract of *Houttuynia cordata* (Luo *et al.*,2009; Fung *et al.*,2011; Lau KM *et al*.,2011) flavonoid extracted from *litchi* seeds and beta-sitosterol from the root extract of *Isatis indigotica* Further, following herb-derived naturally occurring compounds including sinigrin (IC50: 217μM), indigo (IC50: 752μM), aloe-emodin ,hesperetin, quercetin, epigallocatechin gallate gallocatechin gallate (IC50: 47 μM) ,herbacetin, rhoifolin and pectolinarin (Gong *et al.*,2008; Lin *et al.,* 2005; Nguyen *et al.,* 2012). were able to inhibit the SARS 3CLpro activity. Moreover, herbacetin, isobavaschalcone, quercetin 3-β-D-glucoside, and helichrysetin all these flavonoids had the potential to block the enzymatic activity of MERS-CoV 3CL protease.(Jo *et al.*,2019; Jo *et al.,* 2020).

Future Aspects

The COVID-19 outbreak is proving to be an unprecedented disaster, especially in the most affected countries including USA, China, Italy, Iran and in all aspects of health, social and economic. It is too early to forecast any realistic scenario, but it will have very hazardous impact worldwide. If high income countries, especially those already affected by the outbreak, seem to face a catastrophic perspective, in low-income countries there seem to be two possible scenarios. In particular, in the worst-case scenario, when the COVID-19 outbreaks, the majority of countries were unprepared, with low resources allocated for ording the viral emergency and the consequences will be catastrophic. In the best case scenario, similarly to the global outbreak of the SARS-CoV in 2003, also the COVID-19 will not affect in Africa or South America on a large scale suggesting that respiratory viruses spread more effectively in the winter. It is also reported that UV light affect on the survival of the virus on surfaces, immunological differences of the population (innate immunity), pre exposure with coronaviruses, or the higher temperatures (Hopman, 2020).

This data was also indirectly supported by Chin and colleagues that artificially reproduced differential environmental conditions with aim to study the virus survival capacity. (Chin, A.*et al.*, 2020). In addition to this hopeful low impact, if the prevention measures will be implemented, we could register a lower incidence of hygiene-linked diseases that still represent leading causes of death. (El Bcheraoui, *et al*., 2020; Francesco *et al.*, 2020).

Current status of Covid -19 in India

Prime Minister Narendra Modi, on April 14th, extended the previously announced 21-day complete lockdown in bylockdown-2 by extending it 19 days, now slated to end in the month of May 3rd. India has reported total 14,759 active cases of coronavirus and 590 deaths still April 20, 10.45 pm. According to the Ministry of Health and Family Welfare.

The Maharashtra has recorded India's most highest number of positive cases for novel coronavirus at 4,666. Madhya Pradesh, Tamil Nadu, Rajasthan and Uttar Pradesh are also worstly affected and has become lethal. The total tally of confirmed cases of COVID-19 positive in Madhya Pradesh has surged to 1,485, Rajasthan 1,576, Tamil Nadu 1,520 and the Uttar Pradesh is 1,184.

But after Maharashtra, cases worstly increasing in Delhi (47), Uttar Pradesh (18), Tamil Nadu (17), Rajasthan (25), Madhya Pradesh (74), and Gujarat (71), respectively.

The Telangana total confirmed cases have mounted to 873, Andhra Pradesh reported 722, In Kerala and Karnataka 408, and 368 in Jammu and Kashmir, and 392 in West Bengal. Haryana and Punjab have registered 254 and 245 coronavirus cases, respectively. Also Bihar has reported 113 confirmed cases.

Recently, Meghalaya reported 11 positive cases. Arunachal Pradesh and Mizoram stand at 1 case each currently. Tripura has reported 2 cases, whereas the number of COVID-19 cases in Assam stands at 35 currently.

Table-1. Covid-19 cases across the India. (20 April 10; 45 pm).

Name of States & UT	Confirmed	Recovered	Deceased
Maharashtra	4666	572	232
Delhi	2081	431	47
Gujrat	1939	131	71
Rajsthan	1576	205	25
Tamilnadu	1520	457	17
Madhya Pradesh	1485	127	74
Telangana	873	190	23
Uttar Pradesh	1184	140	18
Andhra Pradesh	722	92	20
Karnataka	408	112	16
Kerala	408	291	03
West Bengal	392	73	12
Haryana	254	127	03
J&K	368	71	05
Bihar	113	42	02
Punjab	245	38	16
Odisha	113	42	02
Jharkhand	74	24	01
Uttarakhand	46	18	01
Himachal Pradesh	39	16	01
Chattisgarh	36	25	Nil
Assam	35	19	01
Chandigarh	26	13	Nil
Ladakh	18	14	Nil
Andaman & Nikobar	16	11	Nil
Meghalaya	11	Nil	01
Puducherry	07	03	Nil
Goa	07	07	Nil
Manipur	02	02	Nil
Tripura	02	01	Nil
Arunachal Pradesh	01	Nil	Nil
Mizoram	01	Nil	Nil

The number of confirmed COVID-19 cases in Himachal Pradesh stands at 39; Chandigarh 26; and Chhattisgarh 36. Uttarakhand, Jharkhand and Ladakh have reported 46, 46 and 18 cases, respectively. Odisha has reported a total of 74 COVID-19 cases, the Health Ministry data. COVID-19 tally in Puducherry remains stable at 7 each as of April 21. Goa and Manipur are the only Indian states that have become free from the novel coronavirus disease. Manipur has not reported any new case of COVID-19 after two patients.

Global Scenario of COVID-19

Total number of coronavirus cases has reached 2,250,790 and 154,266 people has died due to novel coronavirus al over globally. In US, the highest number of coronavirus positive cases across the globe at 710,021 while 37,158 people have died. After US it is followed by Spain at 190,839 COVID-19 positive cases and 20,002 deaths whereas Italy has reported 172,434 coronavirus deaths and 22,745 deaths so far. China, where the virus originally came from has seen a decline in the pace at which COVID-19 cases as the Chinese mainland has reported 82,719 cases and 4,632 deaths (Still 20th April).

Conclusion

This review of article provides an insight into the COVID-19 current situation and represents a picture of the current cases of India across the different states. It also provide information about antiviral medicinal herbal extract which act as antiviral properties, which may helps for pharmacologist and virologists for further study. The literature on this topic and hopefully it will helpful in understanding about plasma therapy concept which may prove best practice for the management and treatment of symptomatic cases.

Conflicts of Interest

The authors declare no conflicts of interest.

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