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A REPORT ON COVID-19 AND ITS TREATMENT

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ABSTRACT

Recent world is in an era of global pandemic Coronavirus disease (COVID-19) that testing the community to survive as said by the Darwinian evolutionary theory "*Survival of the fittest*". Coronavirus disease (COVID-19) has become a challenge for the scientific community and researchers because there are no specific vaccines or treatments available for disease and not any existing therapeutic approach has proven its significance in combating the disease. In December 2019 Wuhan city of China has emerged as origin point for disease. Since then the scientific community is trying to find a solution to fight with Coronavirus disease (COVID-19). Few of the existing antiviral and antimalarial drugs has shown some potential but there are no clinical studies in support of the drugs. This is the time that motivates us as a researcher to explore more to make our contribution in the field of science.

KEYWORDS

COVID-19, SARs virus and Treatment.

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INTRODUCTION

Corona virus disease (COVID-19) is caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The novel SARS-CoV-2 corona virus that first appeared in Wuhan city of China, in 2019 and has since caused a great scale COVID-19 epidemic and spread to more than 150 other countries. The chronology of COVID-19 epidemic said that the first case of COVID-19 was reported in December 2019. From 18 December 2019 to 29 December 2019, five patients were hospitalized in critical condition and one of these patients was died. In January 2020, remaining four hospitalized

patients had been identified as having infection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by laboratory. Globally from December 2019 to April 2020 there are 2.5 million peoples infected with COVID 19[1,2].

Most number of COVID 19 cases and deaths were reported in the countries like USA, Spain, Italy, France, Germany, UK and China. Some countries like Turkey, Iran, Russia, Belgium, India and Brazil have found lower Corona cases with compares to other country. It may be due to environmental and climate changes, but yet no any evidences found that climate changes affects the Corona epidemic[3].

PATHOGENESIS OF CORONA VIRUS

Clinically, patients infected with novel coronavirus (SARS-CoV-2) initially presented with a nonproductive cough or dry cough, sore throat, difficulty in breathing and fever. During later phase of the illness, dyspnea and hypoxia, with continued fever and frequently accompanied with diarrhea may seen. Some patient's respiratory status continued to deteriorate and they developed acute respiratory distress syndrome (ARDS) and often shifted to ventilators as they may requiring mechanical respiration.

Corona means crown, they are RNA positive strain viruses. The nucleic acid is approximate 40 kb long, positive in sense, single stranded and polyadenylated. Genomic characterization has shown that the Corona viruses are firstly found in bats and rodents[4]. These viruses came under the Coronaviridae family. Other family members of corona viruses are Alpha corona virus, Beta corona virus, Delta corona virus, and Gamma coronavirus. The initial laboratory report of corona positive patient showed higher leukocyte numbers, higher level of plasma inflammatory cytokines and abnormal respiratory findings. Few reports of COVID 19 showed an infected patient producing coarse breathing sounds of both lungs with cough and fever[5]. The infected patient's sputum showed positive real-time polymerase chain reaction results that confirmed COVID-19 infection. Detection of viral genes showed that the nucleotide sequences of COVID-19 genome share 86.9% identity with severe acute respiratory syndrome virus (SARS-CoV) genome[6]. COVID-19 infection attack on respiratory system and causes severe pneumonia, acute cardiac injury and RNA anemia. The COVID-19 are mushroom-like protein spike, round or oval size and have diameter of 60-140nm. The COVID-19 belongs to the β genus and have crown-like and pleomorphic structure[7].

TRANSMISSION

Firstly Corona virus attacks on Respiratory system. When an infected person sneeze, shout and cough, produce tiny droplets nuclei. According to current evidence, COVID-19 virus is initially transmitted between people through respiratory droplets and contact routes. This virus transmitted through direct surface contact and hence it is advised to maintain a 10-12 feet distance from infected person. Recently few publications have reported some airborne cases of corona transmission. Further studies are needed to identify whether it is possible to detect COVID-19 virus in air samples from patient rooms[8].

Surface contact is a very simple way to spread corona virus from infected person to normal person. When an infected people cough or sneezes virus may settle on the surface of doorknob or countertop. The virus can live on surfaces like plastic stainless steel for 12-36 hours. When a normal person touches this surface get infected with corona virus. Researchers say that a person who have infected with COVID-19 will pass it on to 2 or 3 others[10].

Symptoms

Dry cough
Nasal congestion
Runny nose
Sore throat
Difficulty in breathing
Fever [11]

How to Protect From COVID-19

Maintain social distancing at least of 6 feet
Wash hand with soap
Sanitize hand with alcohol based sanitizer
Work from home

Avoid gathering
Avoid travel[12]

Diagnosis

Physical examination

The initial sign in infected patients may have shortness of breath, moist rales in lungs and increased or decreased tactile speech tremor[13].

Chest X-ray examination

In the starting stage of pneumonia and tuberculosis cases, chest images show multiple small mottled shadows.

Chest CT scan

Pulmonary and lungs lesions are shown more clearly by CT scan than X-ray examination. In children with critical infection, multiple lobar lesions may be present in both lungs. Identification of COVID-19 mainly has done by virus isolation and viral nucleic acid detection techniques. A variety of specimens used for diagnosis such as, sputum, nasal swabs, nasopharynx or trachea extracts, lung tissue, and blood[14,15].

Plasma Therapy

The plasma therapy was discovered by German physiologist Emil von Behring in 1890. World Health Organization In 2014 had recommended the plasma therapy to treat Ebola virus disease. It is still in experimental stage to be used as treatment for COVID-19 patients[16]. In Convalescent Plasma Therapy, plasma from corona infected person who has recently recovered from COVID 19 disease is transfused into a corona infected patient. In this therapy we have take a sample of blood plasma from a patient who have recently cured with COVID 19 infection. From the blood plasma we isolated antibodies and these antibodies transfer in to a corona infected person[17]. In India, Indian Council of Medical Research (ICMR) has recently permitted states to get going clinical trials of plasma therapy[18]. At this condition where there is no official drug available to treat corona infection. The plasma therapy may provide some way for treatment of COVID 19. Some organizations are conducting clinical trials of plasma therapy on corona virus patient and few came out with some good results. Some other countries like USA and UK also started same[19].

DRUGS IN PIPELINE FOR COVID-19

Antimalarial agents

Chloroquine and Hydroxychloroquine

Chloroquine even showed efficacy as a potent antiviral against SARS-CoV infection and its spread. Chloroquine inhibits the infection of cells by SARS-CoV-2 *in vitro*, and approved for malaria treatment. Chloroquine has an immune-modulating activity that may be a reason for its antiviral activity[20]. Mechanisms of action of Chloroquine and hydroxychloroquine (a 4-aminoquinoline derivative) not clearly known, but some assumption reported an increases in endosomal pH and thus makes the environment unfavorable for the virus cell fusion[21]. Chloroquine also affects the glycosylation process of angiotensin-converting enzyme 2[22]. Some of the researcher reported that the malaria drug Hydroxychloroquine and Chloroquine helped to speed the recovery of a small number of patients who were mildly ill from the COVID19. Hydroxychloroquine clinical safety outline is better than that of chloroquine and permits higher daily dose and has less concerns about drug-drug interactions[23].

Antiviral agents

The recent emergence of the new pathogenic SARS-corona virus 2 is responsible for a global pandemic, and there is an urgent need to identify active antiviral drugs[24]. Some of the antiviral agents like Remdesivir were recently reported as a promising antiviral drug against a wide array of RNA viruses. Treatment of a patient having infection of SARS-corona virus 2 with Remdesivir had shows good results[25]. Pharmacological action of Remdesivir is to inhibit viral replication. It is an Adenosine nucleotide analogue and effective against SARS and MERS[26]. Some other examples shown in Table No.2.

Remdesivir is going through a number of clinical trials in several hospitals and laboratory for their activity against COVID-19. An indole derivative Arbidol was effective against hepatitic C and

influenza viruses and also confirmed to have antiviral effect may be useful against COVID-19[25]. Apart from above recombinant interferon α has also proven to be more effective against SARS patients in clinic trials. Some researcher reported Interferon also found to be an inhibitor of MERS-CoV replication[28].

Table No.1: Corona virus cases 19 April 2020

S.No	Country name	Number of cases
1	USA	738,923
2	Spain	195,944
3	Italy	175,925
4	France	151,793
5	Germany	143,779
6	UK	114,217
7	China	82,735
8	Turkey	82,329
9	Iran	82,211
10	Russia	42,853
11	Belgium	38,496
12	Brazil	36,925
13	Canada	33,383
14	Netherlands	32,655
15	Switzerland	27,404
16	Portugal	20,206
17	India	16,365
18	Ireland	14,758
19	Austria	14,689
20	Peru	14,420
21	Sweden	14,385
22	Israel	13,362

Table No.2[26-27]

S.No	Description	Examples
1	Protease inhibitors	Lopinavir, Ritonavir, Darunavir, Cobicistat
2	Nucleoside analogue	Ribavirin, Remdesivir
3	RNA polymerase inhibitors	Favipiravir, Oseltamivir
4	Monoclonal antibody	Tocilizumab, Sarilumab, Eculizumab
5	Fusion inhibitor	Umifenovir

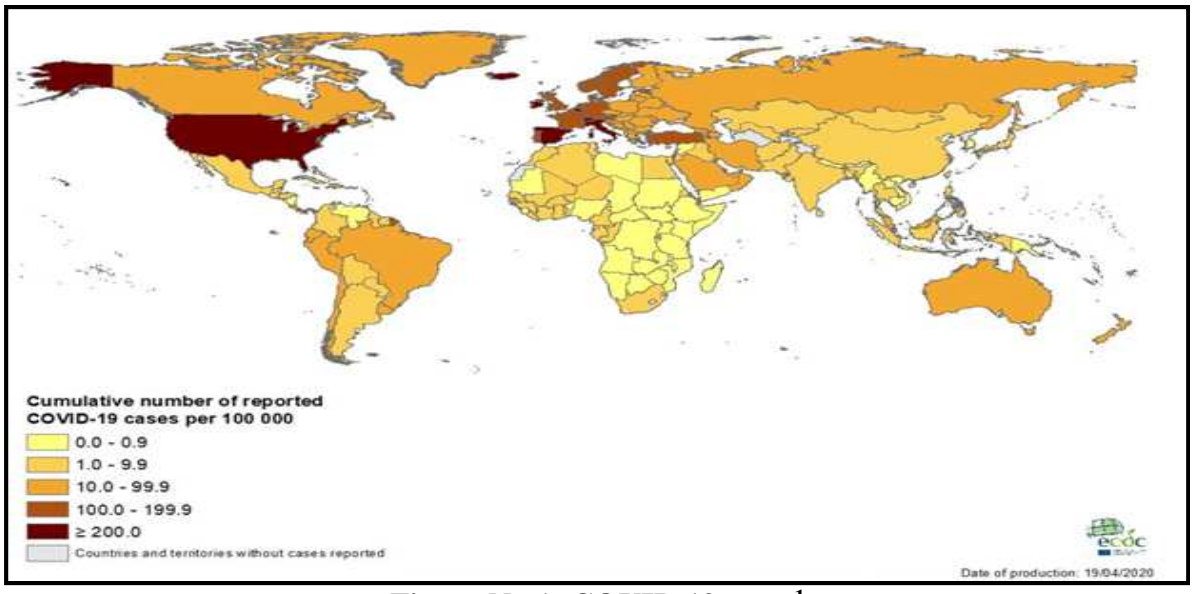

Figure No.1: COVID 19 cases[1]

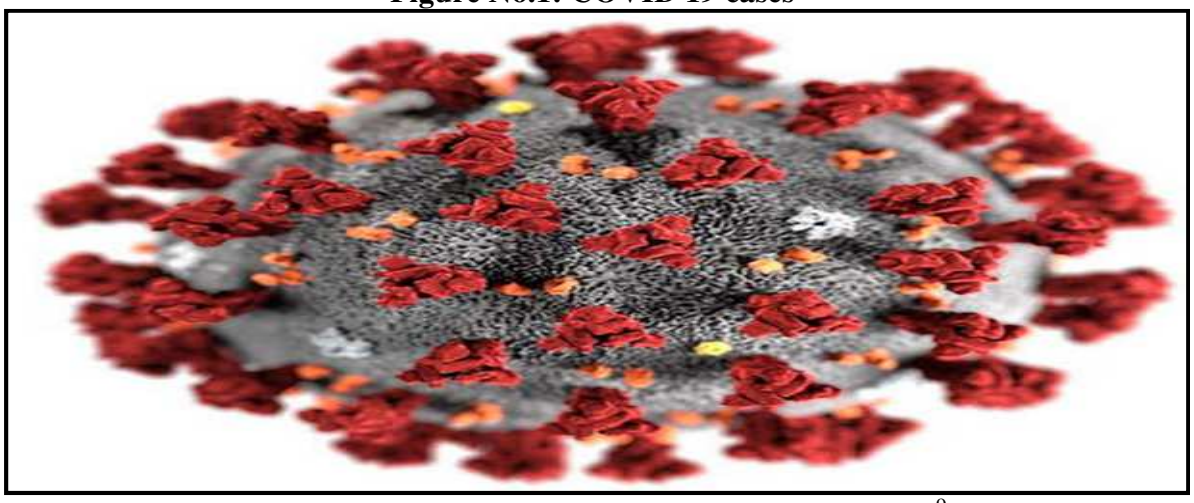

Figure No.2: Illustration of the SARS-CoV-2 virus[9]

CONCLUSION

Since the first outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in Wuhan, China, the disease is spreading worldwide and declared as global pandemic by WHO. Individuals of any ages and specially those who are immunocompromised and suffering from any other disease are at the most significant risk. There is continuous increase in number of person infected with severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) or having Coronavirus disease (COVID-19), simultaneously there is increase in the number of deaths caused by Coronavirus disease (COVID-19). Even with such a drastic situation, we are still in the search of proper treatment against COVID-19. In this condition it is the responsibility of scientific community to explore their scientific potential with some of the existing molecules, antimalarial or antiviral drugs or other molecules. Some other approaches like Plasma therapy, Recombinant interferon α technology also explored for developing a proper treatment of COVID-19. But in future we should have to discover an accurate, potent and targeted approach for treatment of COVID-19.

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CONFLICT OF INTEREST

There is no conflict of interest.

BIBLIOGRAPHY

1. COVID-19 coronavirus epidemic has a natural origin, available from https://www.sciencedaily.com/releases/2020/03/200317175442.htm, accessed on 19 April 2020.
2. Rothan H A, Byrareddy S. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak, *Journal of Autoimmunity,* 109, 2020, 102433.
3. Situation update worldwide, as of 19 April 2020, available from https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases, accessed on 19 April 2020.
4. Lei J, Li J, Li X, Qi X. CT imaging of the 2019 novel coronavirus (2019-nCoV) pneumonia, *Radiology,* 295(1), 2020, 200236.
5. Cascella M, Rajnik M, Cuomo A. Features, Evaluation and Treatment Coronavirus (COVID-19), *Stat Pearls Publishing,* 2020, 1-10.
6. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, *et al*. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China, *Lancet,* 395(10223), 2020, 497-506.
7. Lia G, Hu R, Gu X. A close-up on COVID-19 and cardiovascular diseases, *Nutrition, Metabolism and Cardiovascular Diseases,* 2020, 1-10.
8. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations, available from https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations accessed on 19 April 2020.
9. The Harvard Gazette, Coronavirus Cases hit 17,400 and are likely to surge, available from https://news.harvard.edu/gazette/story/2020/02/as-confirmed-cases-ofcoronavirus-surge-path grows-uncertain accessed on 19 April 2020.
10. How Does Coronavirus spread, available from https://www.webmd.com/lung/coronavirus-transmission-overview#2 accessed on 19 April, 2020.
11. Wu D, Wu T, Liu Q, Yang Z. The SARS-CoV-2 outbreak: What we know, *International Journal of Infectious Diseases,* 94, 2020, 44-48.
12. Xu T, Chen C, Zhu Z, Cui M, Chen C, Dai H, Xue Y. Clinical features and dynamics of viral load in imported and non-imported patients with COVID-19, *International Journal of Infectious Diseases,* 2020.
13. Sohrabia C, Alsafib Z , O'Neilla N, Khanb M , Kerwanc A, Al-Jabirc A, Iosifidisa C, Agha R. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19), *International Journal of Surgery,* 76, 2020, 71-76.
14. Li M, Dong Y, Wang H, Guo W, Zhou H, Zhang Z, Tian C, Du K, Zhu R, Wang L, Zhao L, Fan H, Luo S, Hu D. Cardiovascular disease potentially contributes to the progression and poor prognosis of COVID-19, *Nutrition, Metabolism and Cardiovascular Diseases,* 2020.
15. Hamid S, Yaseen M, Rohela G. Novel coronavirus disease (COVID-19): a

pandemic (epidemiology, pathogenesis and potential therapeutics), *Elsevier Ltd, NMNI,* 35, 100679.

16. Kai Duan, Bende Liu, Cesheng Li, Huajun Zhang, Ting Yu, Jieming Qu, Min Zhou, Li Chen, Shengli Meng, Yong Hu, Cheng Peng, Mingchao Yuan, Xiaoming Yang. Effectiveness of convalescent plasma therapy in severe COVID-19 patients, *PNAS,* 117(17), 2020, 9490-9496.
17. Plasma therapy: Do we finally have treatment for coronavirus disease? Available from https://www.livemint.com/news/india/plasma-therapy-do-we-finally-have-a-treatment-for corona virus-disease-11587454621132.html, accessed on 20 April 2020.
18. Long Chen, Jing Xiong, Lei Bao, Yuan Shi. Convalescent plasma as a potential therapy for COVID-19, *The Lancet Infectious Diseases,* 20(4), 2020, 1-3.
19. Mingxiang Ye, Dian Fu, Yi Ren, Faxiang Wang, Dong Wang, Fang Zhang, Xinyi Xia, Tangfeng L V. Treatment with convalescent plasma for COVID-19 patients in Wuhan, China, *Journal of Medical Virology,* 2020, 1-27.
20. Liu W, Morse J S, Lalonde T, Xu S. Learning from the past: possible urgent prevention and treatment options for severe acute respiratory infections caused by 2019-nCoV, *Chem Biochem,* 21(5), 2020, 730-738.
21. Sarma P, Prajapat M, Avti P, Kaur H, Kumar S, Medhi B. Therapeutic options for the treatment of 2019-novel coronavirus: An evidence-based approach, *Indian J Pharmacol,* 52(1), 2020, 1-5.
22. Colson P, Rolain J M, Raoult D. Chloroquine for the 2019 novel coronavirus, *Int J Antimicrob Agents,* 55(3), 2020, 105923.
23. Malaria Drug Helps Virus Patients Improve, in Small Study, Available from https://www.nytimes.com/2020/04/01/health/hydroxychloroquine-coronavirus-malaria.html, accessed on 20 April 2020.
24. Fantini J, Di Scala C and Chahinian H, *et al.* Structural and molecular modelling studies reveal a new mech-anism of action of chloroquine and hydroxychloroquine against SARS-CoV-2 infection, *International Journal of Antimicrobial Agents,* 2020, 105960.
25. Li-Sheng Wang, Yi-Ru Wang, Da-Wei Ye, Qing-Quan Liu. A review of the 2019 Novel Coronavirus (COVID-19) based on current evidence, *International Journal of Antimicrobial Agents,* 2020, 105948.
26. Singh A K, Singh A, Shaikh A, Singh R, Misra A. Chloroquine and hydroxychloroquine in the treatment of COVID-19 with or without diabetes: A systematic search and a narrative review with a special reference to India and other developing countries, *Diabetes and Metabolic Syndrome: Clinical Research and Reviews,* 14(3), 2020, 241-246.
27. Elfiky A A. Ribavirin, Remdesivir, Sofosbuvir, Galidesivir and Tenofovir against SARS-CoV-2 RNA dependent RNA polymerase (RdRp): A molecular docking study, *Life Sciences,* 253, 2020, 117592.
28. Philippe G, Jean C, Philippe Parola, Van Thuan H, Line M, Morgane M, Barbara Doudier, Johan Courjon, Didier R. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial, *International Journal of Antimicrobial Agents,* 2020, 105949.

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