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Research Article

The Pandemicity of CoV-2 Threatening the Global Health

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Abstract

Corona Virus Disease (COVID-19) is a fatal pandemic affecting global health within a short interval of time. It has been emerged from the seafood market in Wuhan, Hubei Province, China. The origin of virus is still unknown, but mostly from bats or laboratory is a controversy, though many are focusing on wild animal market (especially pangolins, the most trafficked mammal on earth). It causes respiratory and gastrointestinal anomalies. Lymphopenia is a cardinal feature of the disease. Older age group, immunocompromised and humans with multiple ailments are more susceptible to infection. Diagnosis can be done through chest CT scan and RT PCR. Quarantine and isolation of infected along with social distancing can depress the epidemic.

Keywords: COVID-19; Chest CT Scan; RT PCR; Lymphopenia; China

Introduction

China has threatened the global health being epicentre of number of emerging and re-emerging viral infections. During the last two decades, China has been witnessed the source of spread of several emerging viral diseases, including an avian influenza (1997), the severe acute respiratory syndrome (SARS) in (2003), a severe fever with thrombocytopenia syndrome (SFTS; 2010) and SARS- Corona virus-2 (2019) [1]. The coronavirus (CoV) has a largest genome among all the RNA viruses, infecting a broad range of host including humans and animals. Most of animal species includes swine, cattle, horses, camels, cats, dogs, rodents, birds, bats, rabbits, ferrets, mink, snake and other wild animals. SARS-CoV and Middle East Respiratory Syndrome (MERS)-CoV are two well-known zoonotic pathogens [2,3] whose epidemic has already stirred the global health. The recent on-going outbreaks are due to SARS-CoV-2 causing disease, renamed as Corona Virus Disease-2019 (COVID-19). Presently it has been constantly evolving, resulting in fatal outbreaks that pose a significant threat to global public health within a short episode. Already it has spread to many countries and continents across the globe. Looking towards the severity of COVID-19 situation, on 30 January 2020, World Health Organization (WHO) declared a Public Health Emergency of International Concern and again on 11 March 2020, WHO declared the disease to be a pandemic [4].

Clinical sign and pathogenesis

SARS-CoV infects ciliated bronchial epithelial cells and type II pneumocytes, using angiotensin-converting enzyme 2 (ACE2) as a receptor and MERS-CoV infects unciliated bronchial epithelial cells and type II pneumocytes, using dipeptidyl peptidase 4 (DPP4; also known as CD26) as a receptor [5]. SARS CoV-2 also infects type 2 pneumocytes and ciliated bronchial epithelial cells using ACE2 receptors [6] alike SARS CoV. The main pathogenesis of COVID-19 infection includes involving respiratory system with severe pneumonia, combined with the incidence of ground-glass opacities, and acute cardiac injury [7]. It causes respiratory, digestive, and systematic manifestations. The period from the onset of clinical symptoms to death ranged between 6 to 41 days, depending on the age of the patient and status of the patient's immune system. Older age group are quite susceptible than the young ones. The most common symptoms include fever, cough and fatigue, while other symptoms include sputum production, headache, haemoptysis, diarrhoea, dyspnoea and lymphopenia [8]. Lymphopenia is a cardinal feature of COVID-19 with elevated Lactate dehydrogenase

and Creatinine kinase [9]. The respiratory symptom in COVID-19 is due to the occurrence of cytokine storms, resulted in imbalanced and exaggerated immune responses, and finally leading to multiple organ failure [10] and death. Unlike the other CoVs, SARS CoV-2 can be transmitted through airborne particles and droplets. Both the asymptomatic and symptomatic patients secrete similar viral load, spreading the disease [11]. It reflects asymptomatic patients to be a potential source of spreading infection, since it is difficult to diagnose them. Fomite transmission and iatrogenic transmission is also possible due to surface stability of virus.

Diagnosis

Diagnosis can be made by specific RT-PCR of nasopharyngeal or oropharyngeal swabs and lower respiratory tract samples. Though the impact of virus transmission through stool remains uncertain, it can be detected in stool samples in patients with therapy-associated diarrhoea or with stomas. Studies suggest that rectal swabs are helpful and specific in detecting disease at later stage of disease. But sometimes the PCR panels may not detect coronavirus even though the patient if infected with infection, since, its lack of sensitivity, insufficient stability, and take a relatively long processing time. Hence, verification of suitability of the assays in local use for COVID-19 disease testing need to be performed [12]. Chest CT has a high sensitivity for diagnosis of COVID-19. Chest CT may be considered as a primary tool for the current COVID-19 detection in disease clusters with different degrees of ground-glass opacities with/without crazy-paving sign, multifocal organizing pneumonia and architectural distortion in a peripheral distribution [13]. Lymphocytopenia can be a primary presumption, since it occurs in due course of infection [9]. Presently, development and validation of an immunodiagnostic test is highly necessary for large effective screening of cases. A rapid and simple point-of-care lateral flow immunoassay (ALLTEST 2019-nCoV IgG/IgM Rapid Test Cassette, Hangzhou ALLTEST Biotech Co., Ltd. Hangzhou, China) for detection of IgM and IgG antibodies against COVID- 19 has been developed, but the validation in different field conditions are still pending [14].

Origin of CoV

When the whole world was in confusion regarding the evolution of COVID- 19, White House asked scientists to finally investigate whether the Covid-19 virus was bio-engineered (i.e. created in a lab). Soon after it became a hot topic for media people to gather statements from researchers in China and created a controversy [15]. At this juncture, it may be a "smoking gun" report from a scientist Xiao and Lei [16] who stated, the killer coronavirus might be probably of laboratory origin, in addition to origins of natural recombination and intermediate host. He argued that the bats carrying CoV ZC45 were originally found in caves and trees, in Yunnan or Zhejiang province, both of which were more than 900 kilometers away from the seafood market. Again in the city, neither the bat was a food source, nor was any bat traded in the market. This brings less probability of transmission from bat naturally. Since two laboratories are conducting research on bat coronavirus in Wuhan, which are situated at only 280 meters and 12 kilometres from the seafood market, might be the probable source of accidental spill over. In such, the environmental safety levels reinforced high risk of biohazardous laboratories. Many authors also claim for a common exposure point for all of the infected individuals, the seafood market in Wuhan, Hubei Province, China and the restaurants of this market are quite famous for serving several types of bush meat dishes for human consumption [17]. So, the meat of infected/carrier bush meat may be a source of infection. Most of the diseases are of animal origin. Also, SARS-CoV and MERS-CoV were transmitted directly to humans from market civets and dromedary camels, respectively and both viruses are thought to have originated in bats [5]. Wei., *et al.* [1] found that the 2019-nCoV is a recombinant virus between the bat coronavirus and its origin is unknown. The recombination may have occurred within the viral spike glycoprotein, which recognizes a cell surface receptor. Xiao., *et al.* [18] claims for the possibility of recombination between Pangolin-CoV-like viruses with that of Bat-CoV-RaTG13-like virus and pangolins act as the intermediate host of COVID-19. So, in this ambiguity, the source of infection may be identified and a retrospective study can be done to control the sources of spreading. By which future outbreaks can be avoided.

Bioterrorism primarily focus on weaponisation of virulent bacteria or virus particles to be used against enemy countries. Spencer [19] defined bioterrorism as "the use of micro-organisms as weapons of catastrophic effect which can be described as: the category or method of use of a weapon system that results in a significant negative impact on a nation's physical, psychological or economic well-being, thereby causing a major modification of routine activity. Most of the work done in the area of bioweapons has been conducted by military or state organizations, only a small percentage of the overall activities have been publically reported. In due course of time many countries engaged themselves in developing the bioweapons next to nuclear weapons, even after Geneva Protocol of 1925 to check it. After the ineffectiveness of Geneva protocol, WHO suggested and pressurised US, UK and Soviet governments, as well as less than 100 other nations to sign a new Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction

(better known under the abbreviation BWC) in 1972, which was enforced in March 1975, and latter continuously reviewed [20]. It was not even about half century to over for the convention, the World Trade Center and the United States was attacked by bioweaponised anthrax particles through letters in the year 2001 [21]. The next generation bio-war may threaten the global health, which need to be stopped by enforcing the existing act. In the context of CoV-2 following CoV-1 which is epicentre at China and covered to rest part of world, may be investigated for the source of origin. Many publications are justifying the origin from bat etc, but still it unknown to rest part of the world suffering from the pandemic severely. Also, within a short time interval it spread to almost every area of the globe, then that of CoV-1. At this juncture control and eradication is most important, with the support of all other countries. Steps like "lockdown" with social distancing, washing of hands and face mask has been taken by many countries to control the epidemic, till an effective vaccine will come into market.

Conclusion

After evolution of different man-made bombs to destroy the human race, the evolution of bioweapons began. Many countries engaged themselves in developing different virulent and pandemic strains of bacteria, viruses etc, which can also devastate the human race as is witnessed by more than half million infections worldwide and death toll rising everyday. So, in this arena of bioterrorism, the world health is at high risk in this fragile environment. So, in the controversy of origin of CoV-2, the circulating CoV-2 should be checked for the laboratory strain which they have maintained, if the statement involving smoking gun is correct. Or else the proper climatic condition should be checked, which might be favouring the genetic mutations of viruses frequently in epicentre at China. Looking at the present situation, development of a proper effective therapeutic strategy and vaccine is highly necessary. Several countries across the globe has stepped up their trade restrictions, quarantine and isolation of suspected and public awareness for social distancing. India has locked down for 21 days and is a great step for such a populous country to control the disease. So, quarantine and social distancing measures may slow its further spread, and have been adopted in many jurisdictions, till there is a vaccine and registered treatment regimen.

Conflict of Interest

The authors declare for no conflict of interest.

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